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ABSTRACT

The annual report of the USOE Bureau of Research for fiscal year 1967 is concerned with the various projects and programs supported by the Bureau. The introduction briefly describes the objectives relating to research, development, demonstration, dissemination, and the training of researchers. The sources of funds are listed, together with the dimensions of the supported activities, which include regional educational laboratories, research center-type activities, the Educational Resources Information Center (ERIC), and educational research training programs. The main section of the report outlines some highlights of the Bureau's accomplishments. Research, development, and demonstration activities are combined under three headings: 1) improving teaching and learning; 2) curriculum improvement; and 3) school administration and services. Dissemination efforts and research training accomplishments and goals are dealt with separately. Appendixes include a description of the Research Advisory Council, and listing of the educational laboratories and participating states, the research and development centers, and the ERIC clearinghouses. (MBM)

HIGHLIGHTS

Cooperative Research is a partnership in which Federal support is provided for educational research and research-related activities conducted outside the Office of Education. This partnership was authorized by the Cooperative Research Act in 1954 and initially funded with $1 million in fiscal year 1957. The Act, as subsequently expanded, had $57.6 million in appropriations in fiscal year 1967. Support is used to round out a balanced program of educational research, development, demonstration, dissemination of research results, and training of researchers for further educational improvement efforts. Funds also are authorized to construct and equip educational research facilities.

Major Cooperative Research accomplishments during the 1967 fiscal year resulted from support of more than 900 separate research activities, ranging from small projects to a nationwide network of educational laboratories. Highlights follow.

- More than $17 million was given to 20 regional educational laboratories to create an array of tested alternatives that local educators may adopt to strengthen and advance their programs.
- Almost $10 million was provided to support a broad spectrum of research and development center-type activities aimed at the improvement of teaching and learning.
- The Educational Resources Information Center (ERIC) network of clearinghouses collected and disseminated educational research information in 18 substantive areas (12 with support from Cooperative Research and the remainder from other authorizations).
- A monthly journal, *Research in Education*, began publishing abstracts of recently completed research and newly funded research projects, indexed by subject, author, and institution.
- Direct research training was provided for more than 1,500 individuals. Thirteen institutions received support to expand or improve their research training programs.
- Support of about $20 million for individual research projects provided answers to a variety of educational needs for improved materials and techniques.
- BRICS, the Bureau of Research's Information Control System, entered the pilot stage. A computerized management tool, BRICS will substantially strengthen the administration of the Office of Education's research program.
- The administration of small project research and research development grants was decentralized, enabling the Office of Education's regional offices to bring certain related services closer to researchers.

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Through:

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Training

A summary of educational research projects and programs administered by the Office of Education, submitted under title IV, section 2(d), of Public Law 89-10.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Wilbur J. Cohen, Secretary

OFFICE OF EDUCATION
Peter P. Muirhead, Acting Commissioner

BUREAU OF RESEARCH
Norman J. Boyan, Associate Commissioner

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LETTER OF TRANSMITTAL

U.S. Department of Health, Education, and Welfare
Office of Education
Washington, D.C. 20202

December 23, 1968

To the Congress of the United States:

As Commissioner of Education, I am pleased to submit the annual report of the educational research and research-related activities carried out pursuant to the authorizations of the Cooperative Research Act (Public Law 83-531, as amended by title IV of Public Law 89-10 and title I, part D, of Public Law 89-750), for the fiscal year ending June 30, 1967. The report is transmitted in accordance with the requirements of title IV, section 2(d), of Public Law 89-10.

The major focus of the report is on the educational research, surveys, and demonstrations, the information disseminating activities, and the research training receiving Cooperative Research support administered by the Office of Education's Bureau of Research. However, to place these activities within the context of the Office's total support for educational research, the report also includes general information about activities funded under other authorizations for research and related activities.

Respectfully,

Peter P. Muirhead

Peter P. Muirhead
Acting U.S. Commissioner of Education

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INTRODUCTION

One of the principal objectives of the Office of Education is to provide the means by which the American educational system can undergo continuing qualitative improvement. The fundamental reason for improving the system is to provide the best possible education for all students at all levels of learning. This publication is concerned with cooperative efforts to further that improvement through research and related activities.

RESEARCH OBJECTIVES

The foundation for any kind of improvement--in education, as in all fields--is knowledge and its orderly and deliberate implementation in operational settings. Thus, the central purposes of the U.S. Office of Education research program are (1) the generation of knowledge about learning in education, (2) the development of validated and economically feasible alternative instructional "products" (for example, materials, techniques, equipment, processes, organizational forms) for adoption at local choice and initiative, and (3) the dissemination of information that will enable local schools to be aware of and implement the new knowledge and techniques. A necessary concomitant is the training of research personnel to assist with the systematic research, development, and dissemination necessary to bring about the needed improvements. The question is not whether education (in the aggregate) in this country is as effective as it is in some other country but whether it is as good as it should be for each individual served.

Educational research usually is thought of as flowing from the initial production of basic knowledge, to the development of materials and processes, to operational installation of results. However, school systems are oriented toward the various skills, the attitudes, and the knowledge systems calculated to serve individuals. Consequently, there is a strong flow backward as operational problems require development programs which, in turn, reveal the need for certain basic information and theory.

Such interrelationships, including the forward and backward flow of information, help to shape the research process which gives direction to change. The incorporation of research findings into development is just as important, and often times as difficult, as incorporating newly developed processes into operational settings. Therefore, a delicate balance is needed between research and development on the one hand and operational feedback on the other, to assure improvement not only of the educational system but also of the process by which effective change is accomplished. When the focus is upon the quality of education rather than upon the "quality" of the students, schools may concentrate on finding ways to improve their own effectiveness.

Definitions which should serve as a basis for understanding the scope of the research effort are given below.

Research (sometimes called fundamental studies) includes all those basic research activities designed to produce knowledge about the learning process. It may include studies to improve learning theory, to deepen the understanding of the chemical, biological, and neurological processes underlying learning, or to improve the understanding of motivation and its role in learning. Studies to uncover the effects of environmental influences on learning may be concerned with relationships which the home, the community, and parental, socioeconomic, and other variables have to learning. Studies of the social context of learning may investigate the classroom as a social system, the effects of the peer culture on learning, the political, social, and economic relationships between the school and society. Other areas of fundamental studies include small group processes, learning in the cognitive and affective domain, student perception, test and measurement theory, and the educational change process. Survey and data collection efforts, which assess current progress or form a base for later measures of growth, may also be classified in the basic research category. In other words, the focus of basic research is upon finding out what is; this is in contrast to development, which focuses upon production of what may be.

Development is directed to the improvement of the processes by which educational objectives may be achieved. It normally starts with a description of practical needs or problems to be resolved and may include the creation and validation of new practices, fresh materials, refined processes, and novel instructional organization forms. Development identifies what is needed, builds on what is known and available, and attempts to fill the gap between what is and what is desired. Activities in this category are production oriented toward specified objectives. They include the designing of materials or strategies, and also the production, testing, and validation of products. The goal of development activities is to provide local schools with an array of improved and tested alternatives from which to choose.

Demonstration generally refers to specific arrangements which show fully developed and tested techniques and materials in operational settings to acquaint educational professionals and the public with promising innovations which may be adopted, or adapted, for local use.

Dissemination activities include all those efforts to provide efficient distribution of information or knowhow from the findings of research or the products of development or even the process of educational improvement. Besides printed and published materials about research findings, it also includes public information and assistance in engineering desired educational change. Information about research completed or under way is essential to others engaged in fundamental studies or those who wish to incorporate the latest findings into development activities. In their planning, both school people and researchers need to know what developments have been completed or are under way.

Training of researchers is necessary to provide the full range of educational research, development, demonstration, and dissemination. This function also includes program development to expand and improve training opportunities.

MANAGEMENT OF THE RESEARCH EFFORT

The Federal investment in educational research is relatively recent, dating largely from initial funding of the Cooperative Research Act in fiscal year 1957, when colleges, universities, and State education agencies were authorized to undertake research, surveys, and demonstrations with support from the Office of Education.

The principal reason for managing research supported by the Office of Education is to achieve maximum gains from the expenditure of available funds and manpower. Procedures are required to allocate limited resources among research, development, demonstration, dissemination, and training functions. Management determines priorities among substantive research and development activities. It attempts to insure equitable distribution of effort to meet long-, medium-, and short-range needs, and to serve those areas having no spokesmen. It also provides coordination with other Federal agencies involved in the educational research effort.

Overall guidance for the research programs of the Office of Education is the responsibility of the Research Advisory Council, whose 12 members are appointed by the Secretary of the U.S. Department of Health, Education, and Welfare for staggered terms. The Council regularly deals with major policy and procedural questions and advises on decisions relating to the investment of research appropriations. The Council, and the administrative units of the Bureau of Research, also depend on the special advice and recommendations of other non-Government advisory groups, such as the Advisory Committee on New Educational Media, the National Committee on Educational Laboratories, the Advisory Committee on Vocational Education, and the Advisory Committee on Library Research and Training Projects. In addition, educational leaders, specialists, and representatives of educational organizations are convened on an ad hoc basis to make special contributions on issues as they arise. (For additional information on the functions of the Research Advisory Council, see Appendix A.)

"Management" as used in this report means different things for programs than for projects. A **program**, for example, is a long-term effort to investigate an area of continuing concern. A **project**, on the other hand, is a more definitive activity that has as its objective a specific outcome within a specified time. Such an outcome may be either a finding or a "product." A higher level of decisionmaking is generally required to establish a continuous program than to support a separate project.

Research management is concerned with improving the procedures by which proposals are processed, how activities are monitored and reported, and how findings are communicated to the various publics. In addition to seeking advice from formal and ad hoc groups of non-Government advisers, the Bureau of Research maintains a roster of about 200 consultants and 700 field readers whose services are used in their individual specialities. In general, consultants give specialized advice on particular research problems or policies, and field readers evaluate specific research proposals.

Proposals (applications for support) follow a standard format. They are logged in and screened by a central coordinating Research Analysis and Allocation Staff (RAAS). Those eligible for consideration are distributed to staff personnel responsible for administration of activities which may be selected for support. In fiscal year 1967, about 2,400 new proposals were received and processed.

All proposals go through a standard review procedure. As a result, specialized funds may be used where appropriate, and the more generally applicable Cooperative Research funds may round out a balanced total program. By using a consolidated list of adviser, consultant, and field reader specialities, it is possible to involve a broad range of advice on proposals which are complicated by multiple components.

During fiscal year 1967, the administration of the research program was greatly strengthened by the installation of the Bureau of Research Information Control System (BRICS). This computerized data system enables management to keep abreast of the various stages of proposal processing, their approval and funding stages, and their subsequent monitoring through the receipt of interim and final reports. Information from BRICS is particularly useful in the Bureau of Research's program planning and evaluation effort.

At the beginning of fiscal year 1967, all of the OE research authorizations were administered through the Bureau of Research. Toward the end of the fiscal year, research related to the handicapped was lodged in the new Bureau of Education for the Handicapped. However, the RAAS and BRICS staffs continue to service proposals and to provide management information for ongoing research activities under all of the authorizations, thus facilitating continued coordination.

To improve administrative procedures and promote widespread interest in research participation as a vehicle for effective educational change, two categories of project support were decentralized to the OE regional offices during fiscal year 1967. These were Small Project Research and Research Development Grants. By the end of the fiscal year, six of the nine regional offices were processing small project proposals from their respective regions and carrying on certain liaison activities for the Office. (The other three regional offices were scheduled to become operational during fiscal year 1968.)

Large-scale program activities and the bulk of project research activities continue to be administered by staff members in the central Office of Education, with emphasis on coordinating support from the various authorizations.

SOURCES OF FUNDS AND PATTERNS OF SUPPORT

The Cooperative Research Act is by far the largest of the Office of Education administered authorizations for support of educational research and related activities conducted outside the Office of Education. Because it is also the one general (noncategorical) source of support for these activities, its effectiveness should be measured in terms of its efficiency in filling the gaps around other authorizations and blending the total support from all authorizations into a coordinated and efficient total effort. Table 1 is a summary of these investments and table 2 gives a more detailed list of obligations from the various authorizations for fiscal year 1967.

LEGISLATIVE AUTHORIZATIONS FOR RESEARCH ACTIVITIES

The Cooperative Research Program

The Cooperative Research Act--P.L. 83-531 (1954), as amended by title IV of P.L. 89-10 (1965) and by title I, part D of P.L. 89-750 (1966)--is the broadest legislative authority for extramural research and related activities administered by the Office of Education. The Cooperative Research Act initially authorized the Office to enter into jointly financed cooperative arrangements with universities and colleges and State education agencies for the conduct of research, surveys, and demonstrations in the field of education.

The 1965 amendments to the Cooperative Research Act broadened the scope by providing for construction and equipment of facilities for research and related purposes; expanding the research, survey, and demonstration authority to include dissemination of information derived from research; providing for training of personnel for educational research and research-related fields; and permitting individuals, private industry, and nonprofit agencies to participate in research and related activities. The 1965 legislation also authorized $100 million for construction and equipment of research facilities over a 5-year period. The 1966 amendments permit research training programs to be carried out by contracts as well as by grants and broaden the definition of "construction" to include acquisition and replacement of existing buildings.

In fiscal year 1967, the Cooperative Research authorization provided more than half of all the available Office of Education support for extramural research and related activities. Funds were used for 20 regional educational laboratories, 12 clearinghouses in the Educational Resources Information Center (ERIC) system, 10 research and development centers, 5 pilot studies in policy research, an early childhood research system, 140 research training programs, and 718 separate research projects representing all areas of research interest. Also, a limited amount of the support appropriated for facilities was used for equipment of laboratories and centers.

Vocational Education Research and Training

The Vocational Education Act of 1963, P.L. 88-210, Sec. 4(c), directs that 10 percent of funds appropriated under the Act be reserved for grants for research and training programs to improve vocational education, especially that which involves youths in economically depressed areas who have academic or socioeconomic handicaps which prevent them from succeeding in the regular program. Support in fiscal year 1967 included State Research Coordinating Units (RCU's), teacher-administrator training institutes in vocational education, two research and development centers (one of which had a related ERIC clearinghouse), and a variety of separate research projects dealing with program evaluation, curriculum development, vocational education resource development, guidance and career choice processes, and adult and continuing education.

Media for Educational Purposes: Research and Dissemination

Media research under title VII of P.L. 85-864 (NDEA, 1958, as amended) is in two parts. Part A provides support for research and experimentation in the development and evaluation of projects involving television, radio, motion pictures, printed and published materials, and related media of communication for educational purposes, including development of new and more effective techniques for using the media, training teachers to use them, and presenting academic subject matter through them. Part B provides support for dissemination of information concerning new educational media through (a) studies and surveys to determine need for increased or improved utilization of the media for educational purposes, (b) demonstrations, and (c) publications and reports. Appropriations in fiscal year 1967 were used for a clearinghouse on educational media and technology and for 63 research, development, demonstration, and dissemination projects concerned with uses of media for educational purposes.

Language Development Research and Studies

The foreign language research provision of title VI, section 602, of P.L. 85-864 (NDEA, 1958) supports studies to determine the need for increased instruction in modern foreign languages, to improve methods of teaching such languages, and to develop specialized materials for use in language instruction or in training language teachers. In fiscal year 1967, the bulk of support was used for 72 research and development projects, involving many of the less commonly taught languages. Through a cooperative arrangement, a small portion of the appropriation was transferred for use in NDEA language centers.

Library Research and Development

Title II, part B of the Higher Education Act of 1965 (P.L. 89-329) provides support for research and demonstration activities to improve libraries and training in librarianship, for development of new techniques, systems, and equipment for processing, storing, and distributing information, and for the dissemination of information derived from such research and demonstrations. Funds in fiscal year 1967 were used for an ERIC clearinghouse on library and information sciences and for 36 projects concerned with improvement of library operations and services.

Education of the Handicapped: Research and Demonstration

P.L. 88-164, the Mental Retardation Facilities and Community Mental Health Centers Construction Act of 1963, as amended by P.L. 89-105 (1965), provides support for research and demonstration projects relating to education for the mentally retarded, hard of hearing, deaf, speech impaired, visually handicapped, seriously emotionally disturbed, crippled, or other health impaired children who need special education. The 1965 amendment authorized expansion to allow construction of a facility for research and related purposes. Supported activities in fiscal year 1967 include 14 Instructional Materials Centers, an ERIC clearinghouse for exceptional children, and a variety of separate research and demonstration projects. Construction funds also were obligated for the establishment of a center to provide continuous research and demonstrations in the area of education of handicapped children and youth.

Some related research and training is provided through the authorization for *Captioned Films for the Deaf*--P.L. 85-905 (1958) as amended by P.L. 87-715 (1962) and P.L. 89-258 (1965). Support from this authorization is used primarily for film production and services, but those projects concerned with research and training in the use of films with the deaf are coordinated with the more general research and demonstration program for handicapped children and youth.

Foreign Currency Financed Research

Part of the foreign currencies held by the United States under P.L. 83-480, the Agricultural Trade Development and Assistance Act of 1954, as amended, may be used for educational research and related projects in designated countries. In fiscal year 1967, resources from this authorization were used for 20 research and translation projects, chiefly in Israel and India. A related program of comparative education studies included 12 projects supported out of Cooperative Research funds and two special contracts which used OE salary and expense funds for studies of foreign educational systems. Here again is an example of coordinated support from various authorizations to round out research needs in a particular area.

DIMENSIONS OF SUPPORTED ACTIVITIES

An assessment of accomplishments from research supported through the Office of Education is facilitated by an understanding of support patterns. As a general rule, activities receiving long-term *program* support should be assessed in terms of both their immediate yield and their potential for solving educational problems. On the other hand, activities receiving *project* support--because of their more transitory nature--are likely to be assessed more simply in terms of their immediate contribution to educational advances. The distinction, however, is not always clear-cut.

Project Research

As used in this report, the word *project* has been reserved for those activities supported by relatively

Table 1.—Federal Investment in Educational Research and Related Activities From Legislative Authorizations Administered by the U.S. Office of Education, 1957-67[1]

(Obligations in millions of dollars)

Legislative authorizations	Fiscal years											Totals
	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	
Cooperative Research Program, P.L. 83-531 as amended	1.00	2.31	2.67	3.20	3.36	4.64	6.98	11.50	15.84	50.69	57.64	159.83
Language Development Research and Studies, P.L. 85-864, Title VI			2.39	4.01	1.98	2.00	1.80	1.82	2.55	2.79	3.09	22.43
Media Research and Dissemination, P.L. 85-864, Title VII			1.60	3.07	4.73	4.75	5.00	5.00	4.96	3.85	4.37	37.33
Foreign Currency Financed Research, P.L. 83-480					.02	[2]	.01	.39	.22	.56	.51	1.71
Research component of Captioned Films for the Deaf, P.L. 87-715 amendment to P.L. 85-905							.11	.20	.25	.30	.45	1.31
Education of the Handicapped: Research and Demonstration, P.L. 88-164 as amended								1.00	2.00	5.99	8.09	17.08
Vocational Education Research and Training, P.L. 88-210, Sec. 4(c)									10.26	17.14	9.97	37.37
Library Research and Development, P.L. 89-329, Title II B											3.38	3.38
Totals	1.00	2.31	6.66	10.28	10.09	11.39	13.90	19.91	36.08	81.32	87.50	280.44

[1] Authorizations listed in order of funding.

[2] Less than .01 million.

Source: Grants-in-Aid and Other Financial Assistance Programs Administered by the U.S. Department of Health, Education, and Welfare, 1967 edition, pp. 89-99, adjusted to show actual instead of estimated obligations for 1967. Research component of Captioned Films for the Deaf, from program records.

Table 2.—Summary of Obligations for Research and Related Activities Administered by the U.S. Office of Education, by Legislative Authorization: Fiscal Year 1967

Legislative authority	Obligations		Number of activities	
Cooperative Research Program (P.L. 83-531, as amended)		$57,635,819		912
Project Research (all areas)	$20,513,601		718	
Programs				
Regional Educational Laboratories	17,712,674		20	
Research and Development Centers	8,030,276		10	
Early Childhood Laboratory System	1,298,630		7	
Pilot Centers for Policy Research	599,852		5	
Educational Resources Information Center Activities	2,692,742		12	
Research Training Programs	6,481,000		140	
Construction and Equipment at Laboratories and Centers	307,044		–	
Research under other authorizations				
Vocational Education Research and Training (P. L. 88-210, Sec. 4(c)) Including project research, personnel training institutes, State Research Coordinating Units, and 2 R&D Centers)		9,972,139		160
Education of the Handicapped: Research and Demonstration (P.L. 88-164, as amended) (Including Instructional Materials Centers, research and demonstration activities and $2 million for construction)		8,085,764		126
Language Development Research and Studies (P.L. 85-864, Title VI)		3,093,548		72
Educational Media Research and Dissemination (P.L. 85-864, Title VII)		4,371,464		64
Library Research and Development (P.L. 89-329)		3,381,052		37
Foreign Currency Financed Research (P.L. 83-480)		510,000		20
Research component of Captioned Films for the Deaf (P.L. 87-715 amendments to P.L. 85-905)		450,000		15
Total, all obligations		$87,499,786		1,406
Funds carried over for future years				
Cooperative Research Construction and Equipment appropriation balances from fiscal years 1966 and 1967		30,781,441		

short-term contracts or grants (generally not more than 3 years, renewable annually) between the Office of Education and the contractor or grantee. Commonly, such a project has predefined procedures and a specified end product according to the nature of the particular project. It may be as small as a one-teacher pilot study or as large as a national assessment. It may involve any one or a combination of research functions (research, development, demonstration, dissemination, or training) or may build subsequent activities upon the results of previous ones. The distinction here is that an activity receiving project support is one that has been selected and funded as a separate entity by the Office of Education (or one of the regional offices in the case of small projects) and is not a study carried on as part of some continuous activity receiving program support.

Thus, project support can be used for a variety of pilot efforts, for one-shot surveys or studies to determine present status or new directions, for multiple attacks upon emerging critical areas, for deliberate development and testing of alternatives, and to encourage and broaden participation in systematic educational improvement. It is a highly valuable vehicle for building flexibility within the total research effort.

It may be adjusted to whatever kinds of research activities promise most effective and practicable results, thus providing freedom for a viable, self-renewing approach to educational improvement. In fiscal year 1967, new and continuation projects received approximately half of the total support from Office of Education administered authorizations for educational research and related activities.

Program Research Activities

Major Office of Education investments in program research and development during fiscal year 1967 were in the 20 Regional Educational Laboratories; in 12 Research and Development Centers and in center-type operations in early childhood education and in policy research; in a network of 18 Educational Resources Information Center (ERIC) clearinghouses, coordinated through Central ERIC in the Office of Education; and in various research training programs at institutions throughout the country. Except for two research and development centers in vocational education and six ERIC clearinghouses in specialized areas, support for these activities was from the Cooperative Research Act. Other authorizations were the source of support for such specialized programs as the Instructional Materials Centers for Handicapped Children and Youth, the State Research Coordinating Units (RCU's) in vocational education, and certain activities for the training of vocational education personnel.

Regional Educational Laboratories.--The laboratories account for the largest investment in activities receiving program support. They are the direct outgrowth of the landmark Elementary and Secondary Education Act of 1965, in which Congress authorized the Office of Education to help support regional educational facilities to serve as focal points in speeding intelligent and widespread application of promising educational improvements in local schools. The 20 laboratories, scattered across the country, evolved from regional initiative in developing their own organizations and goals. All have wide representation from State educational agencies, universities and colleges, public and private schools, and other educational interests. They develop their own policies and direction, have established their own interlaboratory coordination mechanism, and are served by a special committee of non-Government advisers.

By early in fiscal 1967, each of the laboratories had established an organizational structure and formed a governing board, drawing broadly on the varied human resources of its region. By the end of the fiscal year, the laboratories were pursuing their purposes through the creation and operation of programs--

to develop new materials and instructional methods for upgrading the curriculum for all students,

to adapt and develop special materials and techniques for teaching youngsters from disadvantaged social, cultural, or economic backgrounds,

to augment the range of skills of teachers and administrators,

to develop and apply new technologies to instruction and to classroom and school management, and

to develop improved forms of organization within schools and between schools and communities.

The specific program activities of the individual laboratories were selected by their governing boards and staffs. At the same time, the institutional continuity which the national laboratory program offers has facilitated a move toward establishment of a cooperative information exchange. Already, several interlaboratory efforts have been launched.

In their efforts to bridge the gap between educational research and educational practice, the laboratories are creating a rich array of tested alternatives for local educators to use in coping with today's and tomorrow's ballooning educational problems and needs. They also are using the expertise brought to them by involvement of different agencies and institutions to pursue courses that will hasten the processes of improvement. Some concentrate on problems indigenous to their region. For instance, the Southwest Educational Development Laboratory at Austin is developing programs for three of its regional groups with unique educational needs: Mexican-Americans, Negroes, and French Acadians. Other laboratories focus on improving the skills and effectiveness of teachers in a variety of situations. Still others are helping schools devise and implement programs which encourage flexible progression of students. Some of the laboratories are coordinating their efforts to improve the education of children of migrant workers.

Of the $17.7 million invested in laboratory operations during fiscal year 1967, somewhat more than half was used for development activities, including refinement and adaptation of programs and practices, evaluation, and demonstration. An estimated one-fourth of the total operating costs went for dissemination and related activities. A relatively small proportion went for basic research needed to back up other efforts. Some support was used for inservice training of staff to cope with the functions inherent in the translation of available educational know-how into effective practice.

The list of laboratories with their areas of major concern is shown in Appendix B.

Research Center-Type Activities.--Center operations focus a sustained and indepth research and development effort on major problem areas in search of new concepts and materials and prototypes of improved educational practices. In fiscal year 1967, Cooperative Research support was used for 10 Research and Development (R&D) Centers, for a group of coordinated studies on early childhood education, and for some exploratory activities to help school systems refine their policy-making strategies.

In each of the R&D centers, scholars from several disciplines conduct a coordinated program of basic and applied research and development for the solution of problems in the center's particular area of concern. Working with cooperating schools and other agencies, the centers emphasize the discovery of new knowledge and the development and testing of improved instructional practices. The continuous nature of the centers and their concentration of human and financial resources on major educational problems over several years permits the staffs to make long-range plans and to adjust their activities as research knowledge grows.

About $8 million of Cooperative Research support was invested in the 10 R&D centers in fiscal year 1967. Approximately one-half of this went for research, somewhat more than one-fourth for development (including related evaluation and demonstration), and the remainder about equally for dissemination and training activities. Two other centers received support from the Vocational Education Act of 1963.

Another center-type activity, called the National Laboratory on Early Childhood Education, was established in fiscal year 1967 to add to the basic knowledge about children, to evaluate the theories and methods being employed in working with young children, and to help develop institutional programs based on this research. The program consists of a central coordinating unit and ERIC clearinghouse and several cooperating centers. The $1.3 million invested in these activities in fiscal year 1967 went almost entirely for research and development in approximately equal proportion, with a relatively small part for related dissemination efforts. The Office of Economic Opportunity contributed some additional funds for operation of the clearinghouse.

Appendix C shows R&D centers, their addresses, and areas of concentration.

Five exploratory efforts were launched in fiscal year 1967 to research the factors affecting future educational policy and to define alternative strategies school systems might use for determining such policy. On the basis of the initial findings, 1968 funding was announced for two Policy Research Centers where a diverse staff of educational researchers, administrators, and policy-related personnel would carry on continuous research to help the schools develop the necessary future orientation for educational decisionmaking.

The Educational Resources Information Center (ERIC)--The Center, with its clearinghouse network, is a national information system designed to serve education by making available reliable, current educational research and research-related materials. Each clearinghouse specializes in documents and related services in a particular area of education. Of the 18 clearinghouses in operation at the end of fiscal year 1967, 12 were supported primarily by funds from Cooperative Research, and the other six by authorizations for support in their special areas. (See Appendix D for a list of clearinghouses and their specific fields of concentration.)

The basic elements of the ERIC system include: (1) Central ERIC, with staff in the Bureau of Research, responsible for coordinating the system and for arranging for acquisition of documents from all OE-supported programs and from other Government agencies; (2) the ERIC clearinghouses, which receive, analyze, and index documents in their respective areas and perform related service functions; and (3) contractors who provide document reproduction services and merge the output from all the clearinghouses into a monthly abstract journal, *Research in Education* (RIE). Of the $2.7 million of Cooperative Research funds going to ERIC activities in fiscal year 1967, $1.8 million was for the clearinghouses and $900,000 for the contracted services.

Educational Research Training Programs.--Research training was an important provision of Cooperative Research amendments added by title IV of the Elementary and Secondary Education Act of 1965. To provide for sound educational research and development in the future, support is available for educational institutions and organizations to train researchers and research-related personnel and to initiate or extend programs for such training. Funds may be used, as approved, to strengthen research training staffs and curricular capabilities, for trainee stipends, and for institutional training allowances.

In fiscal year 1967, approximately half of the trainees and two-thirds of the $6.5 million used for direct research training programs went for graduate trainees to increase the flow of competent, committed research personnel into the field. Almost as many participated in the institutes and special projects for intensive and inservice training to meet pressing current needs. Some institutions received support to expand existing programs and others to develop completely new programs.

Other Program Activities.--The Research Development Grant Program, discussed in more detail in the section on Regional Research, is funded out of Cooperative Research. Support from other appropriate authorizations was used in 1967 for a network of Instructional Materials Centers to assist in education of the handicapped, and for State vocational education Research Coordinating Units (RCU's) and personnel training institutes.

Educational Research Facilities

The 1965 amendments to Cooperative Research authorized $100 million over a 5-year period for constructing and equipping facilities for educational research. Appropriated funds remain available until expended. In fiscal year 1967, $307,000 of these funds were obligated to provide needed equipment for R&D Centers and educational laboratories. Pressures for accumulated construction funds are expected to mount as the laboratories settle into their long-range operations.

In a similar program, $2 million in funds appropriated for research on education of the handicapped were obligated for establishment of a facility to serve the needs of that program.

Regional Research

Regional administration of support for small projects and research development grants is designed to broaden participation in the research effort by bringing the processing of small-project proposals and monitoring of projects geographically closer to clientele and by involving smaller colleges and universities which have little history of educational research activity but which have the potential to make a contribution to this field.

Small Projects (under $10,000 and less than 18 months for completion) represent a relatively small total allocation to the regions, but the number of proposals received and processed (more than a thousand in 1967) and the number subsequently approved and monitored, require a relatively large investment of administrative time. However, this is justified because small projects not only attract local participation in a variety of educational improvement efforts but also give practical research experience to some doctoral and postdoctoral students who may later become full-time researchers. Most of the support is from Cooperative Research, but some projects are funded out of other authorizations.

Research Development Grants (up to $50,000, renewable twice at decreasing levels of support) enable groups of small or developing colleges to carry out carefully planned programs to improve their research skills, research their own educational problems, and make use of promising educational innovations. A primary purpose is to help teachers and future teachers learn to use research, research results, and the research or inquiry approach in their classrooms. Five consortiums were supported through their second year of operation in 1967 and 11 new consortiums received grants, all out of Cooperative Research funds.

Besides administration of these two kinds of research activities, regional offices are also called upon to provide certain liaison and other services in connection with operation of the total educational research program. Also, information about regionally administered research activities is fed into the central Bureau of Research Information Control System and reported in *Research in Education,* so that these activities become a functional part of overall efforts to improve education through research.

HIGHLIGHTS OF ACCOMPLISHMENTS

The substance of educational research is the knowledge it engenders, the improved practices or materials it produces, and the effective educational changes it makes possible. The examples in this section are intended to suggest the scope of accomplishments resulting from investment of Federal funds in educational research and related activities administered by the Office of Education. Most of the examples are concerned with accomplishments of activities supported under the Cooperative Research Act which, because of its general provisions and size in relation to other authorizations, is a major determinant of the total research effort. However, where activities supported from other authorizations are cited to round out the report, the source of such funds is indicated in the text.

To simplify the reporting of related findings or accomplishments, examples are shown in substantive areas under headings adapted from table 3. Research, development, and demonstration activities are combined under three headings: improving teaching and learning; curriculum improvement; and school administration and services. Because dissemination and training serve different kinds of objectives, examples of activities under these two functions are reported separately.

RESEARCH, DEVELOPMENT, AND DEMONSTRATION EXAMPLES

As pointed out earlier, the distinction between research and development is not always clear-cut. In general, the object of research is to generate new knowledge--to find out--whereas the object of development is to produce something to satisfy an identified need. Thus, development may be the most direct means of improving educational practice. But there are times when development cannot proceed without research backup, and there are also times when research for its own sake opens new and unexpected possibilities for improved development and/or operations. Evaluation may be either research or development, depending upon circumstances; and demonstration may be part of research or development, or even of dissemination. An analysis of the table 3 estimates under these various functions provides a perspective for subsequent treatment of examples.

As distinguished from general research, educational development is relatively new. Its growth is tied to the local demand for materials and techniques to be applied in engineering effective educational change. By fiscal year 1967, the investment in development (creating the instructional materials and techniques with which students and teachers work) was almost as large as the investment in research (gathering data and increasing knowledge about the learning process). An examination of table 3 shows that projects and other focused activities were somewhat more likely to be research-oriented, whereas multifunction program activities were more likely to be development oriented. The development orientation is particularly evident in the educational laboratories which have a direct responsibility for assisting with educational improvement efforts in their respective regions. For activities focused upon specific subject areas, most of the support went for research to improve teaching and learning and for development activities to improve curriculums.

When there are pressures for available resources--as has been the case with total support for research and related activities--the challenge is to improve the output in order to increase the likelihood of its being used. In the examples that follow, the reader can generally deduce from the text which activities are projects and which are parts of programs, and whether the functional orientation is toward research, toward development, or toward demonstration.

Improving Teaching and Learning

Examples in this section are concerned with investigations which shed light on factors affecting the way individuals--of various ages, abilities, and backgrounds--learn and with efforts to identify or develop improved teaching-learning techniques or to demonstrate such developments. The complicating interrelationships which are typical of the educational system and process are readily apparent in this sample cross-section of research, development, and demonstration activities and accomplishments.

Early Education.--The Office of Education initiated support in 1967 for a more systematic research program on the development of children from birth to the first

Table 3.–Obligations for Research and Related Activities Administered by the U.S. Office of Education, by Research Function and Focus of Activities: Fiscal Year 1967

(Obligations in thousands of dollars)

Kind or focus of activities	Research function[1]					Program totals	Construction and equipment	Total	
	General research	Development (including related evaluation)	Demonstration	Dissemination	Training			Obligations	Number of activities
Programs with multiple functions									
Regional Educational Laboratories	2,115	8,006	3,002	4,241	349	17,713	80	17,793	20
Research and Development Centers									
Cooperative Research	4,099	2,474	486	486	485	8,030	227	8,257	10
Vocational Education	950	577	–	270	110	1,907	–	1,907	2
Handicapped Children	–	–	–	–	–	–	2,000	2,000	1
Early Childhood Laboratory System	580	507	72	140	–	1,299	–	1,299	7
Pilot Centers for Policy Research	600	–	–	–	–	600	–	600	5
Activities with primary (focused) functions[2]									
General Research									
Cooperative Research	6,656	215	60	1,905	5,338	14,174	–	14,174	450
Other	10,645	1,728	1,210	785	22	14,390	–	14,390	234
Curriculum									
Cooperative Research	2,598	6,131	417	654	477	10,277	–	10,277	283
Other	1,999	4,283	290	1,389	277	8,238	–	8,238	164
Education Professionals									
Cooperative Research	1,147	468	16	135	469	2,235	–	2,235	73
Other	505	456	90	611	11	1,673	–	1,673	48
Organization & Administration									
Cooperative Research	2,583	–	–	185	233	3,001	–	3,001	64
Other	396	–	–	–	–	396	–	396	9
Miscellaneous[3]									
Cooperative Research	–	–	–	–	–	–	–	–	–
Other	660	150	450	–	–	1,260	–	1,260	36
Total Cooperative Research	20,378	17,801	4,053	7,746	7,351	57,329	307	57,636	912
Other	15,155	7,194	2,040	3,055	420	27,864	2,000	29,864	494
Total, all authorizations	35,533	24,995	6,093	10,801	7,771	85,193	2,307	87,500	1,406

[1] Distribution for programs with multiple research functions is based on estimates of various program components. Other activities were coded individually according to primary function and the distribution represents the total under each category. Support is from Cooperative Research, unless otherwise indicated.

[2] Includes a wide variety of project research, plus ERIC Clearinghouses, Research Training Programs, and other activities which could be categorized according to primary function and/or subject area.

[3] Includes research related to captioned films for the deaf, research in foreign countries under P.L. 83-480, and language research funds utilized for demonstration in NDEA language and area centers.

school years. This program included a National Coordinating Center and ERIC Clearinghouse on Early Childhood Education at the University of Illinois, Urbana, and cooperating research and development centers at the University of Arizona, Tucson, the University of Chicago, Cornell University, Ithaca, N.Y., George Peabody College for Teachers, Nashville, Tenn., Syracuse University, and New York University.[1] The university-based centers conduct basic studies on intellectual growth, curiosity, interest, and learning behavior and develop preschool curriculums for underprivileged as well as more typical children. Investigations are under way on cognitive, social, personal, and language development; training of professional and nonprofessional teachers of young children; improvement of curriculums and methods; testing and evaluating techniques; and parental involvement and sociological influences on development.

In keeping with published research conclusions that, by age 4, approximately half of a child's general intelligence has been determined, the Cornell and University of Chicago centers have in progress some special studies of infants. Cornell is pursuing the relation between mental abilities and social behavior, while the University of Chicago is focusing on language development and the place of heredity in cognitive growth. Deeper insight into these factors may make it possible in the future to concentrate on prevention of many educational handicaps rather than have to compensate to overcome them.

A related curriculum and teaching method development project which received national attention in 1967 was carried on at the University of Illinois. Instead of approaching early childhood education with the traditional appeal to the child's delight in play and the emphasis on teaching basic manipulative and social skills through indirect means, the preschool techniques developed in this project stress school-related content in learning and thinking and emphasize language, arithmetic, and reading. This approach is based on the theory that the child's capacity for tremendous intellectual growth during early years in best actualized by early application of curriculum and instructional techniques common in the later grades. Substantial gains in IQ on conventionally used intelligence tests have been registered by participating students after two and a half years.

A quite different approach was used by other projects based on evidence that preschool years hold the key to better learning by disadvantaged children. One 2-year preschool study for culturally deprived Negro children emphasized communications skills and dramatic play. After completion of one year in kindergarten, the experimental group--those who had participated in the preschool program--were superior to a control group in achievement, school motivation and attendance, and their relationships with adults.

Higher Education.--At the upper end of the education continuum, one of the research reports submitted by the Center for Research and Development in Higher Education at Berkeley deals with the personality development of 10,000 high school graduates during the first years after graduation. The former high school students were dispersed among many activities; for example, college, jobs, homemaking. Measurements applied in the research indicated that those who spent four uninterrupted years in college changed more than those with four years of job experience. In particular, they developed more formal, reflective, and autonomous patterns of judgment. Also, these differences of intellectual reflection remained significant when the comparison involved members of the college and noncollege groups matched for intellectual ability and socioeconomic background.

As one aspect of its total program, the Berkeley Center has made significant progress in developing data on the factors influencing student success or failure in college, the effects of a variety of specific college environments on intellectual development and motivation, and the impact of more active student involvement in their own education. Studies such as these are designed to provide basic information to support planning by higher educational institutions in the next two decades.

While stories of campus dissent continue to make headlines, there seems to be a trend toward rapid increase in the number of student-directed programs for the evaluation of undergraduate teaching and courses. Indeed, student evaluation of faculty and course content is on many campuses already established as a healthy factor to be considered in determining the effectiveness of higher learning. However, little is known about the range of methods and the comparative reliability of the hundreds of student-directed evaluations formulated annually. Under an Office of Education contract, the U.S. National Student Association is coordinating a 10-campus exploratory study of the problems and prospects of student participation in college evaluation. Committees composed of students, junior and senior faculty, and administrators are formulating evaluation programs at each campus. A board of national consultants in curriculum evaluation, educational research, testing, and automatic data-processing is available to assist the national project staff and the local campuses.

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[1] Later replaced by a center at the University of Kansas, Lawrence.

As part of the project, information is also being compiled on the national spectrum of student-directed programs in college evaluation.

The growth of the community college movement has brought forth a number of studies related to students, programs, and practices in junior colleges, and an ERIC clearinghouse on junior colleges has been established at the University of California at Los Angeles.

Learning and Motivation.--The focus of the Research and Development Center for Cognitive Learning at the University of Wisconsin is on the improvement of educational practices through a better understanding of concept learning, creativity, prereading skills, rule learning, group pressures on individual performance, and the communication effectiveness of various educational media. Results of fundamental research are being incorporated into actual classroom materials in arithmetic, English, reading, and science. This immediate application of research and development to provide for classroom demonstrations constitutes an important extension of the research function.

Harvard University researchers have investigated such learning factors as cognitive ability, personality development, and motivation and societal grouping as related to a variety of cultural, social, and racial settings. In the past, American teaching procedures have too often treated students as though they all learned in approximately the same manner and developed at approximately the same rate. The individual and social differences under study at Harvard may contribute to revision of educational policy and practice in this respect.

Among the basic research investigations in progress at the Harvard Center for Research and Development on Educational Differences in 1967, three are especially noteworthy. In the first, researchers studied nursery school children of diverse economic status, race, sex, age, talent and urban-rural residence to assess whether and to what degree the distinctive characteristics of the children affect their manner of approaching and performing nursery school activities.

In the second, researchers have been developing more valid and precise instruments to measure the intellectual potential of children from different racial and cultural groups. Results from instruments adjusted to avoid cultural bias may indicate needed changes in both classroom teaching practices and curriculum materials.

In a third study at Harvard, the attention of children in learning situations has been the object of investigation. "Attention" is here defined as the actual time and intensity of concentration a child gives to learning. Earlier findings that younger children show more attention ability than older children suggest increased scope and substance for early childhood education. In the current study, a previously developed measure of attention ability is being further refined. This measure has shown an inverse correlation between the attention ability of students on the one hand and teachers' ratings of disobedience and student scores of their own willingness to cheat in academic situations on the other.

Dropouts and the Disadvantaged.–The growing concern for social reforms is reflected in intensified efforts to improve education for disadvantaged students and to identify causes of and provide cures for dropouts.

Many programs undertaken by the regional laboratories are specifically designed to develop curriculums and techniques directed toward improving the education of socially, economically, or educationally disadvantaged children. Included are migrants, rural poor, urban disadvantaged, and such specific groups as Mexican-Americans, Indians, and Negroes. Since 1966, the Center for Urban Education in New York City has been engaged in developing, installing, and testing instructional programs for disadvantaged urban children of elementary school age. Early reading skills, social studies, and science are stressed in the program, which has been operating in 56 New York schools.

The Northwest Regional Educational Laboratory in Portland has produced and tested strategies and experimental materials for teaching Indian pupils and children from inner-city settings. This laboratory has also developed models for raising the levels of aspiration of inner-city children through parent-student counseling programs. The Southwest Educational Development Laboratory's bilingual education materials, designed to develop language skills of disadvantaged Spanish-speaking children, have been implemented in a number of Texas and Louisiana schools. During fiscal year 1967, six other laboratories, including all those located in the South and Southwestern United States, had identified major program goals involving work with specific disadvantaged populations, and an ERIC Clearinghouse on the urban disadvantaged was operating from Yeshiva University.[2]

The above examples reflect some of the obvious interrelationships between research on teaching and learning and development of improved curriculum materials. They also are further evidence that education is all one piece; for example, current efforts to rescue students from dropping out are in part a matter of compensating for past inadequacies in meeting the educational needs of students, particularly disadvantaged students.

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[2] Moved to Teachers College, Columbia University, September 1968.

In research on dropout prevention, the extent of vocational orientation is the deciding factor in determining whether support is from provisions for Cooperative Research or for Vocational Education Research and Training. Supported activities in Norwalk, Conn., at Minneapolis, and in Dade County, Fla., are examples of the latter.

At Norwalk an experimental Center for Vocational Arts is demonstrating a program developed to prevent dropouts, assist underachievers, and enable both to acquire the skills necessary for employment. The students spend 3 hours of the school day at the center and 4 hours on the job, where they receive at least the minimum hourly wage. Each class has a maximum of 15 students with two teachers who have had extensive practical experience in their fields. The ungraded flexible curriculum of job training and basic education is reinforced by intensive counseling, and vocational instruction is given in nine occupational areas. The program capacity is 270 students, who typically are referred to the center by the Norwalk schools as potential dropouts. Last year the center received the Pacemaker Award from the National Education Association in conjunction with Parade magazine for outstanding educational innovation in the State of Connecticut.

In Minneapolis, a Work Opportunity Center is showing significant results in seeking out alienated youth who have left school before graduation, getting them back in school, and working with them individually and in small groups on development of personal and job qualifications. A downtown factory-type building has been renovated; a dedicated staff with genuine interest in each student has been assembled and provided with continuous inservice training; an integrated curriculum to meet the academic and vocational needs of the students is being offered on a nongraded basis. Close working relationships with business and industry in the community guarantee work experience opportunities and placement on jobs. The community health clinic, offering a variety of physical and psychiatric services, and community aides, providing links between students and their families, help students to build new habits of responsibility and self- discipline. Student capacity is 300, and over 1,000 are served each year.

In Dade County, a learning laboratory has been established at Booker T. Washington Junior-Senior High School to upgrade basic skills and vocational preparation of culturally deprived youngsters. The school serves 2,000 students from disadvantaged backgrounds and provides systematic compensatory service to prepare participants for entry into job training. Emphasis during regular school hours is on competency in reading and arithmetic and on raising vocational aspirations and motivations. An attractive and comfortable center is available from 7:30 in the morning to 9:00 at night, under supervision, for enrichment activities, remedial work, and a quiet study place for students who come from crowded, noisy homes. Realistic acquaintance with expectations of employers is provided to students through use of resource people from the community, field trips to businesses and industries, and supervised work experiences.

At Stanford University, a study has been using Cooperative Research support to further investigate the importance of parental occupations and aspirations as predictors of potential student dropouts. Among other things, the study seeks to determine the conditions under which parents' aspirations are transmitted to their children.

Another approach to dropout prevention was a summer writing conference conducted by Educational Services, Inc., Newton, Mass., to continue the development of materials in English and mathematics for use by students from low-income families. The 8-week writing conference brought together 28 teachers, writers, mathematicians, and scientists from high schools and universities in 10 states to provide students with new materials which would encourage them to think and speak freely, to ask questions and find answers, with the teacher serving as guide. The final week's workshop was attended by teachers from Upward Bound Centers.

With today's rising educational expections, the dropout problem is not confined to students of elementary and secondary school age. A study at Oklahoma State University is developing an educational values scale for predicting dropouts among entering college freshmen, and a study at Princeton is investigating the extent to which dropping out of college is related to student self-image and interaction with the college environment.

Flexible Progression.--The concept of flexible progression has become so generally accepted in theory that present efforts are focused primarily upon finding improved ways to manage individualized teaching-learning activities and to report accomplishments of students who are advancing at their own separate rates through their various subjects. For example, an eastern laboratory, Research for Better Schools, Inc., in Philadelphia, has been working with the Pittsburgh-based Learning Research and Development Center to develop and help local schools implement programs of Individually Prescribed Instruction (IPI) for elementary school students. The idea is to plan and conduct with each student a program of studies tailored to his learning needs and to his characteristics as a learner.

The Oakleaf Elementary School in suburban Pittsburgh was the original experimental setting for implementation of IPI. During the 1966-67 school year, the Philadelphia-based laboratory established a network of cooperating schools for field-testing and evaluating the system. In this year the network included five schools; another 21 were added during the 1967-68 school year.

The Pittsburgh center, which operates in an experimental research environment, has had major responsibility for designing the system and developing related technology. The laboratory, which functions in the world of the day-to-day problems of helping children learn, assists with testing and perfecting the system in the field, thus bringing better education to the attention of the schools within reach. Research for Better Schools feeds back to the Learning Research and Development Center information needed to improve the system or, in some cases, the laboratory and schools make the improvements and report back the reasons and results. Through this coordination, it is possible to determine how effective the change to IPI really is under different circumstances and what problems schools--and teachers--encounter in the change.

There also have been efforts to develop and implement other kinds of flexible progression in other places and at other levels. For example, in Brevard County, Fla., Nova High School has demonstrated the operation of a nongraded secondary school, and a project has been undertaken to develop a model vocational-technical school which will unite high schools and community colleges into a vertical organization without grade barriers or unrealistic admission standards.

Use of Educational Media and Technology.--Advances in the use of new educational media and technology are intimately related to the search for ways to improve teaching and learning. In general, funds authorized by title VII of NDEA (Media for Educational Purposes: Research and Dissemination) have been used wherever they are specifically appropriate, while Cooperative Research support has been used for media activities which have more general implications.

The use of computers for instruction is one of the more recent advances in developments involving new media and technology. Computers have shown promise for keeping track of student progress--in the Oakleaf School variety of IPI, for example. They can also be used for certain kinds of direct instruction, leaving the teacher free to serve as diagnostician and to help with kinds of learning the computer is not able to handle. Advances in Computer-Assisted Instruction (CAI) developed at Stanford University, with support from the Office of Education, are currently being implemented and demonstrated by a number of schools through cooperation with regional educational laboratories.

In simple terms, CAI is a means of teaching students, individually, the contents of a course or series of courses through progressive units electronically manipulated. The computer virtually acts as an individual tutor for each student. It repeats as often as necessary, never gets tired or distracted, never forgets which items a student has learned and which still give him trouble; and it never loses its temper or embarrasses the student before his peers. Unlike some group activities, CAI doesn't leave a student in bewilderment because he can't keep up with the class, and it doesn't bore him with busywork whenever he finishes his assignment early.

The computer is limited in its ability to reinforce curiosity, inspire creativity, provide moral and ethical values, or develop interpersonal attitudes. It can give the teacher more time for these by providing relief from routine chores, like recordkeeping, grading, and drill and practice exercises. Furthermore, analyses of feedback from the computer memory bank can be used to improve not only the materials of instruction but the very process of instruction as well, and detailed diagnosis of the learning strengths and weaknesses of each child provides the teacher with helpful information not available in the past.

CAI developments pioneered through the Office of Education grant to Stanford were initially tried out in the Brentwood Elementary School in East Palo Alto, Calif., first in arithmetic and then in reading and spelling. It was found that pupils taught by a combination of computer and classroom teacher moved ahead faster than their peers in regular classes and that boys--who traditionally fall behind girls in the early grades--learn just as well as girls in the computer classroom. The Brentwood experience may also have particular significance for slum schools, burdened as they are with the dual problems of disadvantaged children and harried or inadequately trained teachers. Brentwood itself is in a slum area and has an 80 percent Negro enrollment.

The real test of CAI will come when the revised system is tested on a larger scale and for a longer time. Active collaboration in field testing and demonstration during fiscal year 1967 was provided in some of the schools affiliated with two of the regional laboratories: the Central Midwestern Regional Educational Laboratory (CEMREL) based in Missouri, and the South Central Region Educational Laboratory (SCREL) based in Arkansas. Both laboratories serve school populations in economically depressed areas. CEMREL's region includes a poverty belt in Kentucky, while SCREL's constituency includes the Mississippi Delta Negro, the rural poor of the Ozarks, and nonreservation Indians in Oklahoma and Arkansas.

An early CEMREL demonstration of CAI included Morehead State University and a consortium of schools in Eastern Kentucky. By the end of the spring term, 1967, more than 600 students in grades 1 to 6 had received mathematics instruction by computer for brief periods daily. Uneducated or poorly educated adults enrolled in basic literacy programs also participated in the demonstration. SCREL's similar computer-assisted arithmetic program was initiated on a somewhat smaller scale in the Municipal School District, McComb, Miss.

CAI is by no means limited to drill and practice work in the elementary grades. For example, Florida State University has been developing and testing a physics course in which self-directed learning of nonscience majors is handled through the University's CAI Center.

At the other side of the continent, at the University of Southern California, a computer-controlled manikin has been developed to assist in the instruction of medical students. Described by doctors as "the most complex medical teaching tool ever devised," the life-size computerized manikin has demonstrated the feasibility of teaching all kinds of manual medical techniques with computer-controlled simulators. The simulator, called *Sim One,* is sufficiently lifelike to represent a human patient awaiting surgery on an operating table. It is programed to give humanlike responses to the injection of varying doses of drugs, and its electronic "organs" simulate virtually all the symptoms and physiological responses which might be encountered in an actual operation.

Sim One was developed for use in training anesthesiologists in endotrachial intubation, a delicate technique used in approximately 70 percent of all major surgery. With this training tool, residents can attain proficiency in the technique without risk to human life. At any point in working with the simulator, the instructor can introduce unexpected complications and thus afford the student training in a number of emergency situations that he might rarely, if ever, encounter in a normal residency. *Sim One* thus reduces the time needed to reach the professional level of performance of the delicate intubation technique to 1 to 2 weeks instead of 3 to 6 months. Backed by experience with this extraordinary computer-controlled simulator, tomorrow's surgeon will prepare to operate on his very first patient with practical experience already behind him.

In still another area, a device called the College Suggestor, developed under a previous grant to Northwestern University, entered its demonstration phase in 1967. The College Suggestor assists high school students, counselors, and parents by computer matching of individual student needs, abilities, and interests with higher education institutions most likely to suit their desires and capabilities.

To assess the educational impact of CAI and other advances from the newer technology, Cooperative Research provided support through George Washington University for a team of about 20 educators, scientists, and administrators to develop approaches for predicting a model school system for the 1970's and to formulate long-range research plans to prepare for the kind of teaching and learning to be anticipated.

In recent years, television production has brought an increasing number of high quality recorded lessons for use in preschool, elementary, secondary, college, extension, industrial and continuing education, but the cost of producing such quality materials on a regular basis in local instructional television systems is often prohibitive. Under an Office of Education contract with the Indiana University Foundation, the National Center for School and College Television has been established to demonstrate the feasibility of acquiring, evaluating, and distributing instructional television courses for all levels of education. The demonstration conducted by the National Center is designed to reduce the effective production cost of new television course materials.

To facilitate continued advances in educational uses of media and technology, an ERIC clearinghouse in this area was established in fiscal year 1967 at Stanford University's Institute for Communication Research.

Other Examples of Teaching and Learning Research.--Almost any question about teaching and learning which educators may ask is receiving attention somewhere in the research and development being supported by the Office of Education. There are studies directed to the validation of existing practices and instruments, studies to develop promising alternatives, and investigations of factors which enhance, or impede, learning. At a center at the University of California in Los Angeles, researchers are studying evaluation processes and techniques to help improve the very instruments and procedures for measuring efficiency of instructional programs.

One of the more recent techniques for improving learning is the use of simulation games. The Research and Development Center at Johns Hopkins University undertook a major program in 1967 to assess these games, which are designed to help the individual sense himself to be in command of his own destiny. Use of simulation games grew out of the recognition that culturally deprived children typically reflect less confidence in their capacity to direct their own lives than more privileged children do. This, in turn, adversely affects student achievement. Through the games, disadvantaged youngsters in both segregated and integrated schools make personal decisions about simulated job choices, courses in school, marriage, family, public issues, and community problems.

Because educational games emphasize supportive coaching and teaching rather than classroom control and evaluation of specific student behavior by the teacher, the role of the teacher in educational games reinforces the tendency of the games themselves to increase student self-confidence. This is one more step in giving learners experience in coping with new and changing life situations where individuals must use the knowledge and skills they have to shape the future for themselves and for society.

Curriculum Improvement

Examples in this section are concerned with research and development activities to improve materials, programs, or techniques in specific curricular areas or to demonstrate such improvements. Emphasis is on the substance (knowledge and skills) rather than on the learning process. In general, curriculum improvement efforts are, by their very nature, more heavily oriented toward development than toward research. However, to simplify the overall report, examples are grouped under substantive areas without regard to where they may fall on the research-development-dissemination continuum.

Reading and Other Basic Skills.--The close alliance between a high level of reading performance and excellence in almost all fields of human endeavor has long been recognized. Yet even the so-called "good readers" often function far below their real maximum reading capacity. Under a grant for continuation of Project Literacy, researchers at Cornell University have been stimulating and coordinating basic research on child and adult literacy. Investigators from different institutions and a variety of academic fields have conducted studies in learning psychology, visual and auditory perception, cognitive behavior, neurophysiology of vision, child development, and linguistics as the basis for designing curricular materials and improving techniques for the teaching of reading. Project Literacy activities constitute the broadest research on the reading process ever conducted in one coordinated effort.

In related research, one 15-year study of children's linguistic development, being culminated through a grant to the University of California at Berkeley, won the 1967 Distinguished Research Award of the National Council of Teachers of English. This longitudinal investigation has followed the linguistic development of 338 children from kindergarten through grade 12. Children were found to develop ability to use spoken and written language in definite, predictable stages. Final analysis of the quantum of data generated by the project is to be completed by 1970.

The Center for Urban Education (New York City) is testing and demonstrating the comparative effectiveness of eight different methods of teaching beginning reading from kindergarten to third grade to students primarily from disadvantaged neighborhoods. The project was in its second year in 1967. About 7,600 children from 52 city schools are involved.

The Learning Research and Development Center at the University of Pittsburgh is constructing and testing an innovative approach to beginning reading for children in preschool and primary grades. In comparing effectiveness of methods of teaching reading, the experiment uses color coding of vowels, audio presentation, and combined audio and visual presentations. Results of testing show that children can successfully read unfamiliar words coded in color and can transfer this success to the reading of more complicated words in black and white. Ultimately, the research results may lead to the development of beginning reading materials based on some completely new principles.

At the same center, children's eye movements have been studied to measure attention to learning tasks. The individual time lapse in answering questions or problems, called "response latency," is also under observation. In addition to having implications for reading instruction, understanding these phenomena can clarify the amount of time needed to learn and retain information without wasting time by "overlearning."

The 1967 research conference on dyslexia and related disorders held at Southwest Texas State College recommended a national assessment of the probelm of dyslexia and the use of resources for research, diagnosis, teacher training, and coorective education in this area. In this connection, it is worth noting that emphasis on early systematic reading instruction is a new concept to which educators have been alerted by research evidence of the critical need for early identification of reading disorders and subsequent treatment.

At the Southwest Regional Laboratory (SWRL, Inglewood, Calif.), development and field tryouts of a reading and communication skills curriculum for kindergarten children were in progress during fiscal year 1967. The SWRL curriculum incorporates a wide variety of games and other techniques. During the year, each kindergarten child built his own home library of some 60 books. SWRL also started the development of a curriculum in problem-solving to teach young children (prekindergarten through grade 4) the more complex processes relevant to mathematics, biological sciences, and the physical sciences. The laboratory developed instructional booklets and conducted tests with small groups in 1967. After continued testing and further revision, large-scale trials will follow.

Bilingual instruction materials and techniques, developed at the University of Texas in cooperation with the Research and Development Center in Teacher Education, are being demonstrated through the Southwest Educational Development Laboratory (SEDL, Austin). Teachers instruct boys and girls in their native Spanish, with English taught as a second language. Pilot demonstrations of this program have been undertaken in San Antonio and Edinburg, Texas, and a bilingual instructional program became fully operational in 1967 for grades 1 and 2 at the model Migrant Education Center in McAllen, Tex. The school combines new instructional programs, including team teaching and flexible grade organization, with the best available teaching materials. Four New York City schools are pilot testing the bilingual program in their complex urban environment.

The Research and Development Center on Cognitive Learning at the University of Wisconsin is developing and field testing new designs in arithmetic instruction. One center project has prepared a television program in arithmetic for elementary schools. Videotapes and workbooks for grades 1 to 4 are now in use by approximately 80,000 students in some 2,700 classrooms in Alabama, Minnesota, Wisconsin, and South Carolina. In evaluations made at the end of grade 3, more than two-thirds of the children performed above average. In the Madison, Wis., area field testing of grade 5 materials is in progress. By 1970, a full arithmetic curriculum for grades 1 to 6 will be completed.

A number of supported activities have been focused upon curriculum improvement in English. Some were concerned with communication needs of students with certain problems (deafness or disadvantagement, for instance). Others were concerned with sequential approaches throughout the educational continuum. For example, continuation support was provided to the Wisconsin State Department of Public Instruction for work on a sequential English-language-arts curriculum in linguistics, logic, semantics, composition, and literary analysis and criticism for grades K through 12. The University of Illinois received support for a statewide curriculum study center in the preparation of secondary school English teachers.

By the end of fiscal year 1967, the English Curriculum Center at the University of Oregon had prepared and tested an experimental English curriculum for grades 7 to 12, embracing literature, language, written composition, and speech. The goals of this effort were to define the nature of a curriculum in English more sharply than existing curriculums had done, and to close the gap between scholarly knowledge of literature, language, and rhetoric and the presentation of these to children in school. Appropriate patterns for teacher presentation were also developed in this project. The curriculum materials and detailed teachers' manuals have been completed.

A number of projects were concerned with improving English curriculums in higher education. For example, a 4-year project to devise a flexible and challenging system for teaching introductory English courses was completed in fiscal year 1967 by the University of Kansas (Lawrence). Correspondence study and tutorial residence courses in freshmen composition were combined to economize on space requirements and utilize community talent. At Morgan State College, Baltimore, materials and methodology for improving the reading and writing skills of culturally disadvantaged college freshmen were developed and implemented.

An ERIC clearinghouse on the teaching of English was established in 1967 through support to the National Council of Teachers of English (Champaign, Ill.), and continuation support was provided to Indiana University for operating a clearinghouse on teaching reading.

Physical and Social Sciences.--A number of curriculum activities are in direct response to the demand for educational improvement in the physical and social sciences. In these areas, as in most of education, the trend is to intensify the substance of learning and bring it to students at an earlier age.

Regional laboratories frequently assist with implementation of such educational change. For example, in 1967, the Eastern Regional Institute for Education (ERIE at Syracuse, N.Y.) monitored the installation and studied the use of a new science curriculum in grades 1 to 3 in 19 elementary schools in its region. The curriculum uses a process approach devised by the American Association for the Advancement of Science, oriented to foster the intellectual skills characteristic of scientific thought and discovery rather than to convey factual information. The laboratory has conducted 2-week workshops for teachers in those schools using the new curriculum and developed a program to enable additional schools to adopt the curriculum successfully.

In fiscal year 1967, both the Office of Education and the National Science Foundation contributed to further development and testing of the Harvard Physics Project, which helps nonscience students learn basic science concepts through related study of the cultural roots and humanistic consequences of science.

An ERIC clearinghouse on science education continued to receive support at Ohio State University.

To instructional advances in the "new science" and the "new math" must be added those in the "new social studies." A variety of materials and teaching strategies developed in a cluster of OE-supported activities known as Project Social Studies are becoming available for adaptation by schools seeking to make their courses responsive to current pressures for social understanding and change. Some of the regional laboratories--for example, the Central Midwestern Regional Educational Laboratory (CEMREL) in St. Ann, Mo.--report special programs for teachers and administrators desiring assistance in implementing the new materials.

Meanwhile, work is still progressing on alternative social studies curriculum material development. For example, fiscal year 1967 support was provided for comprehensive social studies projects at the University of Illinois, Northwestern, and San Francisco State College. There also were projects to fill special needs--for example, materials on racial and cultural diversity, resources for use by highly able students, and techniques for handling social and controversial issues.

Curricular efforts in the social sciences were by no means limited to the elementary and secondary school level. For example, the California Junior College Association involved high school, universities, community leaders, industry, and labor in a comprehensive project to upgrade basic economics. Massachusetts Institute of Technology received continuation support to develop a social science program appropriate for undergraduate students in natural sciences and engineering. The University of Denver made progress in developing a course in sociological research methods for law students, which will be field tested before release to law schools throughout the country. A number of research training programs included special work in social science research, a further recognition of education's responsibility in this field.

Arts and Humanities.-Supported activities in the arts and humanities exemplify ways in which funds from a number of different authorizations can be combined to support an area of increasing concern in education. About $1.9 million was invested in projects in music, art, theater and dance, museums, and humanities during fiscal year 1967. Most of it was drawn from Cooperative Research funds, but some also came from the title VII NDEA authorization for media research and dissemination. Some activities--laboratory theater projects at Providence and New Orleans, for example--were funded jointly by title III ESEA and the National Endowment for the Arts, as well as from the Cooperative Research Program.

Two conferences supported in 1967 considered the role of aesthetic education in general education. In one, held at Gaithersburg, Md., educators, artists, and poverty workers analyzed new ideas on the use of the visual and performing arts in the teaching and motivation of economically disadvantaged children. In the other, held in Washington, D.C., 30 international theater figures and about 50 American educators and artists sought new means to improve training, artistic leadership, and design in theater arts.

A study in the New York City schools has been evaluating general improvement in academic achievement attributable to student participation in music programs. Investigators compared achievement levels of 150 "music project" students, whose grade average would ordinarily exclude them from music during junior high school, and another 160 junior high school students in the five participating institutions. In the fourth and final year of the project, preliminary findings show that the arts can stimulate general student academic achievement were other methods have failed.

A project at the Children's Museum, Boston, has resulted in a unique development of curriculum materials for use in preschool through elementary grades. Entitled the MATCH Box Project, it has produced Materials and Activities for Teachers and CHildren. The 16 boxes prepared over a 3-year period contain a variety of films, pictures, games, recordings, projectors, and supplies, together with a teacher's guide suggesting patterns for using them.

In another project at Children's Museum, exhibits are being designed according to validated principles of learning: definition of performance objectives, analysis of learner characteristics, and reinforcement, feedback, and repeated testing and revision of the materials. The exhibits are evaluated as to their attractiveness, staying power, the quality of interaction between the visitor and the exhibit, the learning outcomes of this interaction, and the cost factors for developing and maintaining the exhibits. Because of the consistent attention to these development and design features, the exhibits are termed "validated exhibits."

Systematic research on the integration of drama and theater experiences in the school curriculum has been supported by the Office of Education in a 3-year demonstration project on theater arts. Laboratory theater projects in New Orleans and Providence have enabled secondary school students to see and study first-rate live performances. Pursuing the interest stimulated by the theater, students have used materials in English, history, social studies, and other courses to identify and understand the complex dimensions of the human condition which are brought to life in drama. Arrangements have been made for the Central Midwestern Regional Educational Laboratory to evaluate the relationships between the school systems, curriculum needs, teacher training, student responses, and other factors relevant to the theater projects. Other laboratories--for example, the Central Atlantic Regional Educational Laboratory--have initiated planning activities to improve curriculums in the arts and humanities.

Foreign Languages and Area Studies.--As the world becomes increasingly interrelated by travel, communications, business activities, and government programs, there is a correspondingly intensified need for more Americans to learn a variety of foreign languages. Likewise, better knowledge of particular areas is needed to cope with the progressively more interdependent world economic and social system. Most of the research and development involving foreign languages and area studies has been supported out of title VI NDEA funds, but some activities which have implications for education in general have appropriately been supported under Cooperative Research. The wide range of supported studies should help increase national competence in foreign language and area studies at all educational levels.

A number of projects have been concerned with instructional materials relating to geographic areas. For example, a project at Indiana University is based on the recognition that, in recent decades, Russian studies have been emphasized, perhaps at the expense of needed attention to the national cultures of such countries as Poland, Czechoslovakia, Hungary, Romania, Yugoslavia, Bulgaria, Albania, and modern Greece. The aim of the project is to design strategies for increasing instructional resources for East Central and Southeastern European studies in higher education.

In similar fashion, the State University of New York (Albany) has mounted a large-scale effort to identify and evaluate materials of basic importance to undergraduate library collections on East Asia, South Asia, and Africa.

The growing interest in the development of African nations has led to the funding of two other projects concerned with up-to-date materials about areas of that continent. One at Ohio State University has been developing and testing instructional materials, teaching guides, and content units on the history and culture of Sub-Saharan Africa for use at selected grade levels in secondary schools. The emphasis is upon conceptual attitudinal goals. The other is at Northwestern University and is directed to the production of teaching materials designed primarily for college students. The Northwestern effort is unique in that materials are organized around major themes rather than specific disciplinary aspects of the cultures. This means that individual institutions which choose to use the materials will have ease in adapting them to their particular needs. The United States Information Agency has drawn upon this project for an article disseminated to various areas in Africa to point up United States interest in African studies and our efforts to uplift the quality of African study in our institutions.

An international studies project at the University of Minnesota represents one of the most significant updatings of South Asian information in 75 years. The study involves preparation of a historical atlas with a descriptive text that identifies crucial problems. The completed work will be presented at the World International Geography Congress in New Delhi in 1969.

The Great Lakes College Association is researching a virtually untouched field. The project will produce basic research data on cultural patterns which act as barriers to communication between North Americans and Latin Americans. After the patterns of these barriers have been identified and described, instructional materials can be developed to close the gap between knowledge about and successful participation in Latin American cultures.

Numerous studies have been directed toward development of instructional materials in the less commonly taught languages or toward improved instruction in other foreign languages. For example, a project at Hamilton High School, Sussex, Wis., has developed a course which combines the learning of history and of the German language by use of a text on world history written in graded German. A teacher's manual, tapes, and filmstrips also were developed. By thus connecting language learning with the study of world history and by the use of diverse supporting educational media, it is anticipated that the percentage of students who continue language study after the conventional first or second level will be increased.

To date, materials have been produced in more than 125 of the less commonly taught languages. In fiscal year 1967, an ERIC clearinghouse on the teaching of foreign languages was established with the Modern Language Association of America (New York City) to complement and supplement the work of a previously established clearinghouse on applied linguistics operated by the Center for Applied Linguistics (Washington, D.C.).

Vocational Education.--Recent changes in the American economy--brought on by new technology, mobile population, and increased urbanization--require a very different approach to education and job training from that which was adequate preparation for jobs before the Second World War. To this end, vocational education research activities supported by the Office of Education have been seeking better ways to give individuals the functional skills needed for immediate employment and also the necessary qualifications to choose further education or training. This requires continuous reassessment of career opportunities and development of appropriately updated curriculums for young people and adults. It also requires the retraining of vocational education staff and administrators to keep abreast of demands upon them. Most of these activities are supported out of authorizations for Vocational Education Research and Training, but some of a more general nature are funded out of Cooperative Research.

Conditions which cause simultaneous labor surpluses and skill shortages require continuing study to adjust educational practices to current economic and social needs. In fiscal year 1967, the National Committee on Employment of Youth received support from the Office of Education to examine the training and utilization of subprofessional workers in all fields, particularly in the technical and human services fields which suffer trained manpower shortages. Central to this examination was a 3-day conference of some 50 policymakers and specialists on the expanded use of subprofessional workers.

Preliminary evidence from a 1967 study of the benefits of vocational versus academic (high school) education, conducted at Pennsylvania State University, shows that vocational-technical education had a greater "pay-off" in earnings and employment than nonvocational curriculums. However, there is evidence that vocational-technical education often follows relatively rigid course requirements and remains confined to a small percentage of students who meet certain ability and aptitude requirements.

Studies generally show that youth job training needs to be expanded along innovative lines to develop broad occupational skills and to leave appropriate options as the student matures or the job market changes. A substantial portion of the 1967 investment in vocational education research was used to provide a sound base and appropriate techniques for continuous program evaluation and effective curriculum and resource development to accommodate this demand for broadened student opportunities.

To help vocational guidance counselors prepare the individual for his role in society as an employed adult, and to help him grow both as a person and as a member of the society in which he lives, research has been undertaken to find out more about how concepts of work are formed, how individuals are motivated in work-related situations, and how individual satisfactions are achieved. Emerging and growing occupational fields have been identified and analyzed in terms of content, employment requirements, job outlook, and other important characteristics for curriculum development, educational program planning, and career guidance.

One 1967 motivation study funded by the Office found that job choice is based largely on factors extrinsic to the job and that frequently it is a negative choice. In other words, many young people tend to back into occupational choice by a process of deciding what they do *not* want to do. Efforts to rationalize career decisionmaking may therefore need to start with full realization of the interrelationships between happenstance and deliberate choice in current employment preferences. To the extent vocational education research can yield the tools for decisionmaking and keep open the options, tomorrow's adult should be better prepared for career patterns resulting from technological advances and social expectations.

As distinguished from activities which received project support--which accounted for the bulk of the investment in the vocational research area--three kinds of activities received program support. These were the State Vocational Education Research Coordinating Units (RCU's), certain teacher-administrator inservice training institutes, and two research and development centers, one of which has an affiliated ERIC clearinghouse.

The RCU's--established in 44 States in cooperation with the State departments of education--stimulate, encourage, and coordinate research activities to assist in statewide efforts to improve vocational training. They also disseminate research findings and encourage research utilization. Such research and development is concerned not only with what goes on within the schools but also with the need for future job skills within the State. Support of the RCU's will gradually be phased over to the State agencies.

Teacher-administrator inservice training institutes contribute to the implementation of research findings at the local level with a minimum of delay. The training covers a wide range of subject areas, with attention on (1) emerging occupations for which new curriculums and materials have been developed, and (2) the needs of students with socioeconomic or other social handicaps. During the summer of 1967, 1,385 school administrators, teachers, and guidance personnel participated in the institutes.

Two national vocational research centers insure that research questions central to the improvement of vocational education are given continuous attention. The Center for Research, Development, and Training in

Occupational Education is located at North Carolina State University at Raleigh and the Center for Research and Leadership Development in Vocational and Technical Education is at Ohio State University, Columbus. Their activities complement and supplement each other and are coordinated with the total vocational education research effort. During fiscal year 1967, an ERIC clearinghouse on vocational and technical education was funded at Ohio State and one on adult education at Syracuse University. The latter, while serving adult education needs in a variety of areas, is particularly useful in vocational education where retraining of adults is a fact of life in modern society.

Program Improvement for Handicapped Children.--The education of handicapped children is sometimes a matter of curriculum improvement, sometimes a matter of adaptations in teaching-learning techniques, sometimes an outgrowth of administrative arrangements. The target population for research on the handicapped is the 10 percent of our children who have special educational problems because of mental retardation, emotional disturbance, visual limitations, hearing impairments, speech defects, and crippling illness or other health problems.

Most of the 1967 support for research and related activities to improve education of handicapped children is derived from special categorical authorizations in this area. It is interesting to note, however, that the focus of a large segment of the earliest Cooperative Research activities (in the late 1950's) was upon education of the mentally retarded. Cooperative Research support continues to include some attention to handicapped children through efforts to accommodate individual differences in learning situations; and such research has been coordinated with research more specifically concerned with the handicapped or with development and use of captioned films for the deaf.

About $3 million of the 1967 funds for research in special education were used to explore the roots of problems of handicapped children. Some projects provided needed information on definition, incidence, prevalence, and characteristics of the various handicaps faced by these children. Others studied the kinds of educational programs that enable children to cope with their problems. Still others considered ways to increase the effectiveness of teaching and learning, and the factors related to learning. For example, mental retardation projects were exploring language development, thought processes, social concepts, reasoning, and other factors of learning in mental retardates.

Projects were also developing improved teaching materials and aids for special education based on previous research. New reading codes, perceptual materials, and listening media were being developed for the blind. Self-monitoring devices and improved audiometric tests were being designed for speech and hearing problems. For the deaf and mentally retarded, new curriculums and speech therapy based on research are beginning to open new doors to learning. Training programs, treatment centers, and teacher-parent programs have also been a basis of studies to expand the educational opportunities for the handicapped.

There was a relatively large investment in demonstration projects to show the use of new materials, curriculum techniques, and aids. Included were analytic techniques and lesson designs for the emotionally disturbed; theater, teaching aids, summer programs, and preschool training for the deaf; and programed instruction for the blind and the mentally retarded.

The 14 Instructional Materials Centers (IMC's) supported by this program collect instructional materials and aids, such as braille books, test kits, and tapes and recording devices, evaluate their effectiveness, and make them available to local schools. They form the major arm of the dissemination activities supported under this research program and received almost $1.3 million in 1967. In addition to helping teachers and administrators select materials, IMC staff assist with interpretation of research and appropriate application of techniques for specific situations.

School Administration and Services

This section is concerned with research activities related to schools and school systems (including professional staff and services), as distinguished from activities concerned with the learning of individuals and with the substance of curriculum materials, which were treated in the two previous sections.

Of the 1967 support for activities in this category, the ratio between research and development was about five to one. All together, these activities account for about an eighth of the total investment in research and development activities focused on particular areas. Within the total research effort, they reflect recognition that educational settings and services have important interrelationships with the process and substance of learning. Among program-type activities which have major concerns in this area are the policy research pilot centers and several ERIC clearinghouses.

Most of the support for activities concerned with school settings and services came from Cooperative Research; however, funds from other authorizations were used where appropriate. Library improvement efforts, for example, drew support from a special authorization for activities in that specific area.

Staff Preparation, Selection, and Use.--Whereas each student determines for himself what--indeed, whether--he will learn, teachers and other education professionals determine whether learning will be a pleasant experience, what learning fare will be offered, and what kind of services are available. The training or work of these professionals was the focus of about half of all the research activities related to school settings and services.

Of all educational professionals, teachers make up the largest group and their work is probably most important because of their direct contact with students. Continuous efforts to find ways to upgrade teachers is carried on at the Stanford Center for Research and Development in Teaching and at the Research and Development Center in Teacher Education at the University of Texas. The work of these centers is complemented and supplemented by a wide range of projects in student teaching, teacher selection, inservice education, and other areas concerned with staff improvement. A clearinghouse on teacher education is operated under a grant to the American Association of Colleges for Teacher Education, Washington, D.C.

Three small projects on student teaching are examples of what can be undertaken with limited time and funds. A project at Northern Illinois University involves a survey of student teaching programs in the United States. One at Washington University (St. Louis) has been analyzing patterns of student teaching, and one at Temple University compares results from four types of student teacher supervisory conferences.

In a larger and longer project, the University of Texas in 1967 completed a 4-year study, entitled *Personality, Teacher Education, and Teacher Behavior.* Controlled experiments were used to determine relationships between individual personality, different kinds of teacher education programs, and observable patterns of subsequent teaching behavior. The object was to identify personality factors which affect on-the-job performance and to determine how teacher training could best develop personality assets and correct personality weaknesses of potential teachers.

The University of Washington has been creating a series of films to simulate teacher selection situations. Films include transcripts, application forms and letters, credentials, formal recommendations, and taped interviews, all designed to assist educational administrators to better assess teacher applicants.

The Stanford Center for Research and Development in Teaching concentrated much of its activity during fiscal year 1967 on developing and refining the use of mini- and microteaching units as a new approach to improving teacher performance. These units are self-contained teaching segments that utilize videotapes for teacher self-evaluation and self-instruction. The Far West Regional Educational Laboratory at Berkeley devised two minicourses based on the teacher training approach developed at Stanford and also prepared television programs on new concepts and strategies in teaching, for broadcast on channels in the San Francisco area.

Another approach to improve inservice training was used by the Northwest Regional Educational Laboratory, which demonstrated workshop techniques designed to develop a cadre of "instructional leaders" who then train school personnel in teaching strategies. The ultimate goal is to help teachers train pupils in flexible intellectual thought processes to keep pace with changing knowledge. The importance of this kind of inservice training through instructional leadership lies in potential reduction of the time lag in incorporating new teaching methods widely throughout school systems.

Some projects are concerned with nonteaching staff and with a variety of factors which affect staffing in general. For example, a study at Ohio State University has been investigating the use of community helpers in meeting the psychological and educational needs of emotionally handicapped children, and one at the University of Wisconsin deals with relationships between collective negotiation and teacher participation in policymaking. A number of projects have been concerned with improved guidance of students, and a clearinghouse on counseling and personnel services is operated under a grant to the University of Michigan.

Improvement of Organization.--Studies concerned with improvement of educational organization and administration range all the way from broadening offerings in isolated schools to developing computer capability for program and service management in comprehensive school systems.

At Anatone High School, Anatone, Wash., students learn welding and earth science from the history teacher, speech and drama from an instructor in home economics, Spanish from the English teacher, and mathematical analysis from the athletic coach. This strange pedagogy is made possible in small isolated schools by materials developed and demonstrated with support from title III of ESEA and Cooperative Research support to the Northwest Regional Educational Laboratory (Portland). By use of self-study education kits, schools such as Anatone can still give students a range of choices and resources.

Continuous attention to school organization and administration components is provided by two centers, the Center for the Advanced Study of Educational Administration (University of Oregon, Eugene), and the Center for the Study of the Evaluation of Instructional Programs (University of California, Los Angeles). Some of the work of the Center for the Study of Social Organization of Schools (Johns Hopkins University) also has implications for school administration.

Among other things, the Center for the Advanced Study of Educational Administration has found that student demands for university reforms are significantly related to the leadership exerted by graduate teaching assistants. Frustration and alienation related to teaching assistants may have a parallel in elementary and secondary schools when teachers are faced with responsibilities incommensurate with their teaching authority and incentives.

Princeton University researchers also have been studying the somewhat general student dissatisfaction in higher education in an attempt to pinpoint sources of student stress. The relationships discovered between student self-images and the college environment--besides shedding light on college dropout tendencies--may suggest ways to hold teachers in the profession by matching them with school environments.

The Center for the Study of the Evaluation of Instructional Programs (UCLA) is conducting a wide range of research and development on theory and practice in evaluation. The center does not carry out evaluations per se, but seeks to improve the process and techniques of those who do. A number of systems, models, and instruments are being developed for a variety of evaluation needs. For example, in cooperation with local schools, the center is devising a data system for the use of teachers and administrators in evaluating elementary schools and their programs. The center is also developing a program budgeting system for elementary and secondary schools to assist professional educational personnel with school evaluation.

In a related project, the Southern Association of Colleges and Schools under a grant from the Office of Education is developing and testing a handbook with visual aids to help elementary school staffs evaluate their performance. This is part of an 11-state regional effort to improve the quality of elementary education by self-study. More than 10,000 elementary schools in the South are expected to participate in the program.

A number of studies have been investigating the feasibility of using computers for activities related to organization and administration. These range all the way from primary support of small projects on automated scheduling of high school students to partial support of standardized information retrieval in whole States (California and Iowa). Columbia University undertook the application of computer techniques to problems of balancing racial integration in a metropolitan area, and a St. Louis organization developed a computer technique for allocation of channels and placement of transmitters for closed-circuit television serving a whole region.

Some regional laboratories have made significant commitments to undertake major development efforts in computer technology for school management and actual classroom instruction. The Southwest Educational Development Laboratory is one such group. In 1967 a network of schools in Texas and Louisiana was created by computer linkages, and training programs for local school staff were conducted.

In another study, General Learning Corporation (Washington, D.C.) assessed the feasibility of central computer use by an educational system. This study provided a functional analysis of computer performance and uses, evaluation of alternative designs and time-sharing arrangements, and estimates of relative costs. Studies such as this point the way for cooperating schools to share a computer for routine administrative services and for instruction in programing and data processing.

Urban School Studies.–Many metropolitan areas, as well as some smaller cities in rural areas, are finding that their deteriorating tax bases make it increasingly difficult to fund quality education. To help school policymakers stretch available funds and attract additional ones, the Office of Education has supported a number of studies on administrative and leadership patterns affecting school operation and on the social and economic factors influencing school-community relationships and sound policy formulation.

For example, a study at Florida State University has been researching the relation between fiscal policy and local demand for and ability to pay for education. Findings should help to predict education expenditures under varying social, economic, and political conditions, as a basis for choosing among alternatives in school management.

A study completed by the City University of New York Research Foundation in 1967 studied a sampling of fiscally independent and dependent school districts in terms of efficiency, flexibility, and economic viability in school administration. In addition, an intensive study of large urban districts was made to identify differences in political, administrative, and fiscal controls which affect key policy decisions.

Eastern Michigan University, in research recently completed on community support for metropolitan area public schools, analyzed the consequences of population shifts from central Detroit to the suburbs. Among other things, the study found that lower-income Negro families remaining in the central city devoted more time and attention to school improvement than whites. This finding may have implications for understanding and channeling demands for decentralization of control in inner-city schools.

The Center for Urban Education (CUE), a research and development center which later evolved into a regional laboratory, issued a report in 1967 based on an extensive study of participants and participation in decisionmaking in New York City schools. The 3-year study explored the political forces affecting educational policy and the relative willingness of the system to consider fiscal and administrative improvements.

Other studies at CUE, as well as some at the Center for the Study of the Social Organization of Schools, are concerned with school boundaries and organizational units, as well as instruction. Materials from the ERIC Clearinghouse on the Urban Disadvantaged (previously at Yeshiva University, now at Teachers College, Columbia) also are useful in terms of administering inner-city schools, in the same way that materials from the Clearinghouse on Rural Education and Small Schools (New Mexico State University) are useful in connection with school improvement in more isolated areas.

Library Improvement Efforts.--A systematic program of library research and development was implemented in 1967, primarily through use of the initial appropriation under title II-B of the Higher Education Act of 1965. The authorization recognizes that the accelerated production of new knowledge threatens to strain the ability of libraries and information systems to acquire, store, process, retrieve, and distribute information to students, scholars, and the general public. To accommodate this new program, the Advisory Committee on Library Research and Training Projects identified the following major areas for attention:

- Evaluation and improvement in training techniques for library and information science personnel,
- Assessment of characteristics, interests, and requirements of users,
- Management improvement, including personnel recruitment and utilization, finance, and governmental relations,
- Current and projected roles of libraries in society,
- Integration of library services in school and other instructional programs,
- Control of library resources, including documentation, cataloging, classification and indexing, abstracting, acquisition, network and system planning, and analysis and development of automated procedures, and
- Preservation of materials, storage and physical access, reprography, and application of data processing and other electronic and automatic equipment to library processes.

These and other important problems were attacked in fiscal year 1967 through support for 37 research activities, including state-of-the-art studies, prototype development, feasibility studies, testing and evaluation, and demonstration and implementation activities. A Clearinghouse on Library and Information Sciences was established at the University of Minnesota.

Among the variety of funded projects, examples of those involving computers give some indication of the scope of future library activities. For example, Syracuse University has been developing a prototype system for a computer-based statewide film library network. Other computer-related library research activities include studies concerned with bibliographic automation of library operations using a time-sharing system (Stanford), a computer-based system for handling reserve activities (Columbia University), and capabilities of computers for satisfying user requirements in identifying desired works (Yale). More general projects vary from elementary school library usage in independent study to graduate school preparation of library personnel.

School Facilities Research.--In schools, as elsewhere, facilities affect programs. Wherever authorized Cooperative Research construction and equipment funds have been used, recipients were encouraged to provide exemplary as well as functional facilites, thus demonstrating some of the latest equipment in operational settings.

A number of studies have been undertaken to improve school buildings and equipment. For example, a George Washington University project explored the relationship between learning and school building design. Researchers at Pennsylvania State University developed guidelines for providing good hearing and effective noise control in school classrooms. A study at Rensselaer Polytechnic Institute assessed modular coordination practices in school planning and construction.

A clearinghouse on education facilities was established at the University of Wisconsin during fiscal year 1967.

Research for Educational Planning.--One of the primary objectives of the educational research effort is to provide useful information for immediate and long-range policy decisions.

One example of research to facilitate immediate planning is a Ball State University study of kindergarten requirements in Department of Defense Overseas Dependents Schools. The study defined appropriate kindergarten curriculums, established basic equipment and supply lists, determined educational specifications for classroom facilities, and recommended educational and experience qualifications for professional and paraprofessional personnel.

A higher education study used Cooperative Research support to develop a model computer program for analyzing long-range land, building, and staff needs. The program devised by the University of Washington (Seattle) operates like a huge equation into which are inserted such variables as expected population figures, educational objectives, community services, student body characteristics and projected majors, and institutional research participation. From these data the program can predict departmental enrollments, housing and parking facility needs, and staffing requirements.

To provide a framework for continuous and systematic improvements in education, five pilot centers for policy research were established in fiscal year 1967 to explore possible approaches to educational decisionmaking in terms of future educational needs and resources and prospective changes in society. Cooperative Research support was provided for studies by Stanford Research Institute (Menlo Park, Calif.), Syracuse University-General Learning Corporation (New York), Systems Development Corporation (Santa Monica), Western Behavioral Sciences Institute (La Jolla, Calif.), and the National Planning Association (Washington, D.C.). On the basis of performance in the pilot operations, two centers were to be given longer-term contracts to provide continuous refinement of approaches to educational decisionmaking.[3]

The main task of the operational centers is to provide educational policymakers in schools, colleges, and State education agencies with information and techniques that will aid them in planning for future needs. To do this, center staff will be concerned with future demands of society and how schools might begin now to meet them, and with future resources and technologies and their implications for current educational decisions.

Other Studies of Administration.--Comparative studies of education in foreign countries make up another cluster of projects which are useful for educational administration and planning. In fiscal year 1967, work in the comparative education series was in progress on more than a dozen countries throughout the world. In a related program, funds from P.L. 83-480 were used in India and in Israel for education bibliography and translation projects and research studies of foreign educational problems of interest to American education. Information about education abroad is important not only in improving our own schools but also in advising American students who plan to spend some time abroad and in interpreting credentials of foreign students attending American schools.

DISSEMINATION EFFORTS

Educational research and development has produced unprecedented advances in knowledge about the teaching-learning processes, as well as new curricular materials, new media, and new teaching methods, and these are being tested in classrooms across the Nation. However, the task of educational improvement is too great for each school or school system to have to "discover its own wheel." Consequently, dissemination of the significant results of research and development is of vital importance in enabling local schools to choose from among promising alternative courses of action. Expansion of the Cooperative Research Act through the title IV ESEA authorization for "dissemination of information derived from educational research" has been one of the major steps in bringing research results to those who make decisions about local educational change.

Among the research activities administered by the Office of Education, dissemination of research information is the major function of the Educational Resources Information Center (ERIC) system and of a targeted publication program started late in fiscal year 1967 to bring syntheses of research findings to specific groups of users. In addition, certain individual projects have been directly concerned with finding ways to improve the dissemination process. Dissemination is also one of the functions served by the Regional Educational Laboratories, the vocational education State Research Coordinating Units (RCU's), and the Handicapped Children and Youth Instructional Materials Centers (IMC's). To a lesser degree, some dissemination may be carried out by research and development centers and by many individual projects whose primary function is research and development.

Investment in dissemination can be precisely identified for ERIC activities and for certain individual projects primarily or exclusively focused upon dissemination processes or the production of dissemination materials. For the most part, however, the figures for total investments in table 3 are based on estimates of dissemination components within individual activities serving other functions. Cooperative Research investment in ERIC activities amounted to approximately $2.7 million in 1967 and the regional laboratories estimate dissemination at about a fourth of their total budgets. This relatively high proportion for the dissemination role carried by the laboratories is in keeping with the primary purpose of the laboratories in making educational improvements functionally available to their respective regions, whether through dissemination activities or through further development and adaptation of innovations which show promise of meeting local needs.

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[3] Centers at Syracuse University Research Corporation and Stanford Research Institute were announced in February of 1968.

The examples below are limited to activities which specifically disseminate research or research results to the educational enterprise, the general public, or other research practitioners or sponsors.

Educational Resources Information Center (ERIC).--Through ERIC services, the results of the huge volume of research and development efforts are made available to teachers, administrators, other educational specialists, researchers, public officials, professional organizations, and business and industrial groups. By the end of fiscal year 1967, ERIC consisted of 18 information clearinghouses located in universities and other organizations throughout the country and coordinated through Central ERIC in the Office of Education. The specialized area of each clearinghouse is shown in appendix D. Specialists at each clearinghouse receive, abstract, and index significant reports and documents and provide related services.

Information about reports in clearinghouses is made available to the education community through *Research in Education,* ERIC's monthly abstract journal. Each issue contains research report résumés and author, institution, and subject indexes for quickly locating desired reports. *Research in Education* also contains information about new research projects supported by the Office of Education. In addition to Central ERIC and the clearinghouses, the system includes the ERIC Document Reproduction Service (EDRS) operated under an Office of Education contract. Documents are available at nominal cost in microfiche or hard copy.

The change of ERIC's name from the Educational Research Information Center to the Educational Resources Information Center reflected a broadening of its scope. Even though six of the ERIC clearinghouses were new in fiscal year 1967, the ERIC system was already providing a significant amount of reference materials and bibliographies in response to specific requests. In one month, June 1967, over 20,000 documents were supplied. As clearinghouses become more operational, staff time and energy now devoted to storage and retrieval will be spent on service functions.

Targeted Communications.--A program of "targeted communications" was initiated late in fiscal year 1967 to develop specialized analyses of research in critical problem areas. Support is provided for teams of researchers and educational practitioners to conduct a thorough review of relevant literature to identify promising findings or solutions which are clearly substantiated. Areas of insufficient information or of conflicting evidence are also identified, as are the conditions in actual educational settings likely to facilitate or impede practical application of the best scientific information. Examples of such elements are budget, State law or regulations, and socioeconomic characteristics of the community. The resulting analytic report is developed for the particular audiences identified as most in need of the relevant information.

During fiscal year 1967, contracts were awarded for preparation of targeted communications on vocational curriculums for new occupational fields, on planning community college facilites, on reading research, and on instructional television facilities.

RESEARCH TRAINING ACCOMPLISHMENTS AND GOALS

Rising demands for high quality education and the booming costs of serving increasing enrollments have sharpened the demand for researchers to find ways to improve educational efficiency. The researchers must be able to identify problems and their causes, develop and evaluate promising innovative materials and techniques, further the application of educational technology, and promote the utilization of researched advances in local schools. Funds may be approved for trainee stipends and institutional training allowances, and to strengthen research training staffs and develop specialized training programs.

During fiscal year 1967, about $6.5 million in Cooperative Research support was used for direct training programs serving approximately 1,700 trainees and for a number of program development activities to upgrade or expand institutional training capability. As a result of budget limitations, this support was slightly less than in 1966 but it represented a modest increase in the number of graduate student trainees (albeit at the expense of a reduction in the number of undergraduate trainees served). Some institutions received awards for separate programs while others combined their programs into a single package.

Types of Direct Training.--Graduate training programs represent the major part of the educational research training budget and are directed toward the preparation of fully professional educational researchers. Emphasis is given to the support of interdisciplinary programs designed to attract the most capable and promising students. Fiscal Year 1967 funds supported 812 graduate training positions in 85 programs at 58 institutions. This represents an increase of 80 positions over the previous fiscal year.

Postdoctoral training programs are designed to update practicing researchers in new research techniques and in serving needs of emerging critical areas in education. Thirteen postdoctoral fellows were supported at various institutions in 1967. They were selected from more than 100 applicants on the basis of a nationwide competition.

Undergraduate training programs involved support for 70 training positions. This program is designed to encourage promising students to continue in educational research training at the graduate level.

Immediate research and research related training needs are served by a wide variety of short-term institutes and other special projects. The 14 institutes and 7 special projects supported in fiscal year 1967 served about 800 trainees. Of special interest were training sessions offered in conjuction with the national meetings of such professional goups as the American Educational Research Association.

Development of Training Programs.--Program development awards are especially valuable in strengthening research competency in geographic regions and in developing special competency in emerging areas of major concern. In fiscal year 1967, 13 institutions received funds to improve or expand existing research training programs or to develop new programs.

Examples of Training Activities.--Among the research training programs described above are some activities designed to meet long-term needs for fully trained professional researchers and others to meet immediate needs of persons having research and related responsibilities.

Some 1967 programs emphasized effective evaluation techniques for personnel concerned with programs under titles I, III, and V of the Elementary and Secondary Education Act and other federally supported programs. The University of Maryland conducted a research training institute for 35 individuals selected from positions of leadership in State agencies, and the University of Denver conducted a similar institute for State personnel. At the University of Wisconsin two separate 2-week training sessions were provided for selected personnel from State departments of education throughout the mid-West.

Research training programs were also supported in special areas where particular problems exist or where needed development depends upon the availability of specialized research competency. For example, Indiana University created a 3-year doctoral program in research with special emphasis on audiovisual communications. Graduates of the program will be prepared to conduct research and direct and train others engaged in research and development in audiovisual instructional methods.

A special training project conducted at Ohio State University offered training to 40 individuals selected primarily from the research staffs of the Nation's largest cities. This project was designed to orient representatives of large city educational agencies in research methodology and content applicable to their problems, including the shaping of vocational and technical education opportunities in metropolitan areas.

In addition to direct training activities or program development for such training, a number of other supported research activities have training elements. For example, the regional educational laboratories estimate that they invested almost $350,000 during the year to serve the training needs of their staffs. The research and development centers estimated that $485,000 went for research training for their personnel. Through this kind of on-the-job training, these institutions are playing a significant part in expanding the professional population capable of contributing to new developments in education. Also, support of small projects through the regional research program serves an important purpose as a major incentive for graduate students engaging in educational research and for staff at institutions not previously involved in much research.

As practicing educators increasingly participate in the research process and rely upon research products, the partnership between research and practice should intensify the momentum of the total educational improvement effort.

CHALLENGES FOR THE FUTURE

Both the educational enterprise and society as a whole are in ferment as they are affected by and respond to unprecedented change. The scientific approach by which research and development have helped bring about technological advances is now being challenged to help bring about advances in education. Fortunately, experience with educational research and development under the 10-year-old Cooperative Research Act has provided a framework and pattern of operation for a partnership effort between the Federal Government, State and local educational institutions, and interested organizations, both public and private. Furthermore, the perceptive insights provided to the Cooperative Research effort by the Research Advisory Council and other non-Government advisors has helped to assure continuous responsiveness to current needs and attention to emerging problems.

The steady growth of Cooperative Research support and the addition of related authorizations for support of research in special areas has added further nourishment to this partnership. The effectiveness of the cooperative effort also has been stimulated by the expansion of the research authorization to include dissemination of information derived from research, by the establishment of the regional educational laboratories to help bridge the gap between research and practice, and by the funding of research training programs to expand the number and increase the capability of individuals committed to educational research and development careers. In addition, the authorization of support for constructing and equipping facilities promises to add to the permanent settings in which systematic research can be carried out on a continuous basis.

There can be little doubt that systematic research and development add to the efficiency of the total educational improvement effort and that the partnership approach supported by Cooperative Research and other authorizations is a practical way to share responsibility for advances toward educational goals. However, the need is so great that one might well heed the Queen's advice to Alice in *Through the Looking Glass:* "It takes all the running you can do to keep in the same place. If you want to get somewhere else, you must run twice as fast as that." The research effort seeks to help the schools develop the efficiency necessary to move *ahead* in serving tomorrow's educational needs.

APPENDIX A.--THE RESEARCH ADVISORY COUNCIL

Functions

The Research Advisory Council, a 12-member non-Government body appointed by the Secretary of the Department of Health, Education, and Welfare, advises the U.S. Commissioner of Education and the Associate Commissioner for Research. Its functions include the following:

(1) *Policy Review.*--The Research Advisory Council's advice is sought on specific proposals or projects or groups of proposals and projects which represent policy issues; anticipated changes or program departures; and other items of business as requested by the Commissioner, the Associate Commissioner for Research, or the Council itself.

(2) *Review of Bureau of Research Programs.*--The Council periodically reviews, discusses, and advises the Commissioner and the Associate Commissioner for Research on the programs and plans of the Bureau of Research. The Council comments on the strengths and weaknesses of the total program and its parts and makes recommendations for beneficial changes in emphasis and design.

(3) *Review of Bureau of Research Procedures.*--The Council periodically discusses and advises the Commissioner and the Associate Commissioner for Research on the procedures by which the Bureau of Research plans, administers, and evaluates its programs. These procedures include techniques for planning, for administrative control, for processing proposals (including reviewing proposals and contracting and monitoring projects), and for evaluating the effectiveness of research programs.

(4) *Review of Budget Requests, Proposed Allocations of Funds, and Actual Allocations.*--The Council periodically reviews the requested levels of support for research activities and the allocation of these requests (and appropriations) to different parts of the Bureau of Research program. Such reviews take place regularly at sessions scheduled to dovetail with the budgeting and appropriation process.

Procedures

The RAC functions on the basis of agendas submitted to them 10 days in advance of regularly scheduled meetings. The agendas include necessary supporting material. Items are placed on the agenda by the Commissioner, the Associate Commissioner for Research, and the Council. Agenda items may be added at the time of the meeting only with the concurrence of the Council.

APPENDIX B.--EDUCATIONAL LABORATORIES AND PARTICIPATING STATES

Regional Educational Laboratories supported during fiscal year 1967:

Appalachia Educational Laboratory (AEL)
1416 Kanawha Boulevard
Charleston, West Virginia 25325
(West Virginia, and parts of Virginia, Tennessee, Kentucky, Ohio, and Pennsylvania)

Center for Urban Education (CUE)
105 Madison Avenue
New York, New York 10016
(Metropolitan New York City and some neighboring cities, excluding Long Island)

Central Atlantic Regional Educational Laboratory (CAREL)
1200 Seventeenth Street, NW
Washington, D.C. 20036
(District of Columbia, Maryland, and parts of Delaware, Virginia, and West Virginia)

Central Midwestern Regional Educational Laboratory (CEMREL)
10646 St. Charles Rock Road
St. Ann, Missouri 63074
(Eastern Missouri, southern Illinois, and central and western Tennessee and Kentucky)

Cooperative Educational Research Laboratory, Inc. (CERLI)
540 West Frontage Road
Northfield, Illinois 60093
(Indiana, and parts of Illinois, Michigan, and Wisconsin)

Eastern Regional Institute for Education (ERIE)
635 James Street
Syracuse, New York 13203
(Western Pennsylvania, and New York State, except metropolitan New York City)

Education Development Center, Inc. (EDC)
55 Chapel Street
Newton, Massachusetts 02160
(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont)

Far West Laboratory for Educational Research and Development (FWLERD)
Hotel Claremont, 1 Garden Circle
Berkeley, California 94705
(Northern California, and Nevada, except Clark County)

Michigan-Ohio Regional Educational Laboratory (MOREL)
3750 Woodward Avenue
Detroit, Michigan 48201
(Michigan and Ohio)

Mid-Continent Regional Educational Laboratory (McREL)
104 East Independence Avenue
Kansas City, Missouri 64108
(Western Missouri, central Oklahoma, and parts of Kansas and Nebraska)

Northwest Regional Educational Laboratory (NWREL)
710 Southwest Second Avenue
Portland, Oregon 97204
(Alaska, Idaho, Montana, Oregon, and Washington)

Regional Educational Laboratory for the Carolinas and Virginia (RELCV)
Mutual Plaza
Durham, North Carolina 27701
(North Carolina, South Carolina, and southern Virginia)

Research for Better Schools, Inc. (RBS)
121 South Broad Street
Philadelphia, Pennsylvania 19107
(Delaware, New Jersey, and eastern Pennsylvania)

Rocky Mountain Educational Laboratory (RMEL)
1620 Reservoir Road
Greeley, Colorado 80631
(Colorado, Wyoming, and portions of Arizona, Idaho, Montana, Kansas, and Nebraska)

South Central Region Educational Laboratory (SCREL)
302 National Old Line Building
Little Rock, Arkansas 72201
(Arkansas, Mississippi, and parts of Kansas, Louisiana, Missouri, and Oklahoma)

Southeastern Educational Laboratory (SEL)
3450 International Boulevard
Hapeville, Georgia 30054
(Alabama, Florida, and Georgia)

Southwest Educational Development Laboratory (SWEDL)
800 Brazos Street
Austin, Texas 78767
(Parts of Texas, and southern Louisiana)

Southwest Regional Laboratory for Educational Research and Development (SWRL)
11300 LaCienega Boulevard
Inglewood, California 90304
(Southern California, southern Nevada, and western Arizona)

Southwestern Cooperative Educational Laboratory (SWCEL)
117 Richmond Drive, NE
Albuquerque, New Mexico 87106
(New Mexico, and portions of Arizona, Oklahoma, and Texas)

Upper Midwest Regional Educational Laboratory (UMREL)
1640 East 78th Street
Minneapolis, Minnesota 55423
(Iowa, Minnesota, North Dakota, South Dakota, and part of Wisconsin)

APPENDIX C.--RESEARCH AND DEVELOPMENT CENTERS

In fiscal year 1967, Cooperative Research support was used for ten of the centers listed below and for the Early Childhood Laboratory. The other two centers were supported under provisions for Vocational Education Research.

Fiscal year established	Name of center, location, and area of inquiry
1964	Learning Research and Development Center, University of Pittsburgh, Pittsburgh, Pa. (Learning research and instructional practices)
	Center for the Advanced Study of Educational Administration, University of Oregon, Eugene (School organization and administration in the societal context)
1965	Center for Research and Development on Educational Differences, Harvard University, Cambridge, Mass. (Effects of individual and cultural differences on the learning process)[1]
	Center for Research and Development for Cognitive Learning, The University of Wisconsin, Madison (Cognitive learning)
	Center for Research and Leadership Development in Vocational and Technical Education, Ohio State University, Columbus. (Research and development activities, including operation of ERIC clearinghouse on adult and vocational education)
	Center for Research, Development and Training in Occupational Education, North Carolina State University, Raleigh. (Research and development emphasizing southern needs in adult and vocational education)
1966	Research and Development Center in Educational Stimulation, University of Georgia, Athens. (Programs of early and continuous stimulation, 3- to 12-year-olds)
	Research and Development Center in Teacher Education, University of Texas, Austin. (Teacher education)
	Stanford Center for Research and Development in Teaching, Stanford University, Palo Alto, Calif. (Theory and practice of teaching and its effects)
	Center for Research and Development in Higher Education, University of California, Berkeley. (Organization, purposes, and outcomes of higher education)
	Center for the Study of the Evaluation of Instructional Programs, University of California, Los Angeles. (Study of evaluation processes and techniques)
1967	Center for the Study of Social Organization of Schools, The Johns Hopkins University, Baltimore, Md. (Influence of social and administrative organization of schools on learning of students from diverse backgrounds)

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[1] At the end of fiscal year 1967, program support for the Harvard Center was converted to project support for certain clearly defined activities.

Fiscal year establised	Name of center, location, and area of inquiry
1967	*The National Laboratory on Early Childhood Education* is a center-type activity which includes the National Coordination Center and the ERIC Clearinghouse on Early Childhood Education, located at the University of Illinois, Urbana, and coordinated centers located at the University of Arizona, Tucson, the University of Chicago, Cornell University, Ithaca, George Peabody College for Teachers, Nashville, Syracuse University, and the University of Kansas.[2]

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[2] Replaces earlier center at New York University.

APPENDIX D.--ERIC CLEARINGHOUSES

The network of ERIC Clearinghouses and their locations is given below, with subject areas shown. Twelve received Cooperative Research support in fiscal year 1967. Six were supported by other appropriate authorizations. One was added after fiscal year 1967.

ADULT EDUCATION
Syracuse University
107 Roney Lane
Syracuse, N.Y. 13210

COUNSELING AND PERSONNEL SERVICES
University of Michigan
611 Church Street
Ann Arbor, Mich. 48104

DISADVANTAGED
Teachers College
Columbia University
New York, N.Y. 10027
(At Yeshiva University until September 1968)

EARLY CHILDHOOD EDUCATION
University of Illinois
805 West Pennsylvania Avenue
Urbana, Ill. 61801

EDUCATIONAL ADMINISTRATION
University of Oregon
Eugene, Oreg. 97403

EDUCATIONAL FACILITIES
University of Wisconsin
606 State Street
Madison, Wis. 53703

EDUCATIONAL MEDIA AND TECHNOLOGY
Institute for Communication Research
Stanford University
Stanford, Calif. 94305

EXCEPTIONAL CHILDREN
Council for Exceptional Children, NEA
1201 Sixteenth Street, NW
Washington, D.C. 20036

HIGHER EDUCATION[1]
George Washington University
Washington, D.C. 20005

JUNIOR COLLEGES
University of California at Los Angeles
405 Hilgard Avenue
Los Angeles, Calif. 90024

LIBRARY AND INFORMATION SCIENCES
University of Minnesota
2122 Riverside Avenue
Minneapolis, Minn. 55404

LINGUISTICS
Center for Applied Linguistics
1717 Massachusetts Avenue, NW.
Washington, D.C. 20036

READING
Indiana University
204 Pine Hall
Bloomington, Ind. 47401

RURAL EDUCATION AND SMALL SCHOOLS
Box AP, University Park Branch
New Mexico State University
Las Cruces, N.Mex. 88001

SCIENCE EDUCATION
Ohio State University
1460 West Lane Avenue
Columbus, Ohio 43221

TEACHER EDUCATION
American Association of Colleges for Teacher Education
1156 15th Street, NW.
Washington, D.C. 20005
(Formerly, School Personnel, at City University of New York)

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[1] Funded after 1967.

TEACHING OF ENGLISH
National Council of Teachers of English
508 South Sixth Street
Champaign, Ill. 61820

TEACHING OF FOREIGN LANGUAGES
Modern Language Association of America
62 Fifth Avenue
New York, N.Y. 10011

VOCATIONAL AND TECHNICAL EDUCATION
Ohio State University
980 Kinnear Road
Columbus, Ohio 43212

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